

SOME OBSERVATIONS ON CATARACT AND CATARACT  
PATIENTS IN BIHAR, INDIA.

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I N T R O D U C T I O N.

"In writing a few notes on some of my experiences in cataract operations, my object is not to attempt to tell anything new, because that is well nigh impossible, so much having been already written, and so much of the nature of discovery or invention having been set before our profession during the past few years<sup>1</sup> ..... ." The above few lines were written in 1895 - not by the author! One reads them with interest, not only for their somewhat quaint old fashioned flavour, but also for the opinion which they express. It is a far cry from 1895 - 1925, yet the author of the article, from which those words were taken, evidently thought that so far as the operation for the extraction of cataract was concerned, finality had been reached, even in those days. The only excuse the writer of the present thesis can make then for inflicting more facts, the majority, if not all, of which are already well known, is, that in so doing, he is in good company. Books and articles on this exceedingly interesting disease, with the no less fascinating/

1. Dyer. Medical Missions in India, I. 36.

fascinating operation associated with its cure, have come out in almost endless numbers since the year of grace 1895; some of these publications are instructive, many are interesting; if the present effort may not be classed among the former, the author humbly trusts that a small niche may be found for it in the latter. As Pasteur has it - "Without theory practical work becomes mere routine by force of habit. Theory and theory alone can stir and develop the inventive spirit"<sup>1</sup>. Hence the pages which make up this thesis.

The statistics given in this paper and the conclusions drawn therefrom are the result of six months operating in India during the cold season, Oct. 1924 - March 1925.

The scene of operation was the small village of Bamdah situated in a sparsely populated and somewhat inaccessible part of Monghyr, a district in the province of Bihar, formerly the northern part of Bengal, now a separate state. Keeping in mind those facts, remembering also that we are 15 miles from the railway, with bullock carts as the only wheeled means of conveyance between the village and the station, it will be seen that Emerson's lines might with very little adaptation indeed, describe the *raison d'être* of this hospital exactly:-

"If/

1. Introductory Lecture at Lille to students of technical science. Dec. 7th, 1854.

"If a man can write a better book, preach a better sermon, or make a better mouse trap than his neighbours, though he build his house in the woods, the world will make a beaten path to his door." I think it will be admitted by those who read a little further that the world of cataracts, as it exists in these parts, has made that track to Bamdah.

It is hardly necessary to add that none of this credit is due to myself. Medical Mission work was started there in 1889 by the missionary in charge to-day, Dr Macphail, and, in that time, it has risen from nothing to its present dimensions. My stay at Bamdah was due to two reasons - (1) to the necessity for additional help in hospital during the heavy work of the cold season 1923-24, (2) to carry on during the furlough of Dr Macphail; although the actual figures given in this paper relate only to the cold season 1924-25, the thesis naturally embodies all the experience gained during one's entire sojourn in those parts.

The foregoing remarks, local and personal, are, I think, necessary to enable the reader to get the proper setting for the field of operation; the figures and conclusions, which follow, will, I hope, prove not too wearisome. If, at times, the line of argument used, seems to be as streaky as one's ink is apt to become in this land, the author trusts that these shortcomings/



shortcomings will be dealt with gently; a temperature ranging from  $90^{\circ}$  -  $110^{\circ}$  in the shade is not always conducive to the best mental effort.

The total number of operations performed for senile cataract in the period under review was 1250. This period, previously stated as six months, in reality exceeds the calendar half year by a few days, as it extended from Oct. 1st 1924 - April 6th 1925. For the purpose of this paper, all cataracts in patients over 30 years of age, with the exception of those caused by trauma, have been defined as senile. This definition is, I think, sufficiently accurate in a land like India for all practical purposes.

The various diagnostic findings in those 1250 cases, represented by 982 patients, are appended. A glance through the figures will show how rich in clinical material were the six months under review, not merely from the point of view of cataract pure and simple, but also in that they afforded one an insight into almost every conceivable variety and type of complication and abnormality, some of them of such a nature as only to be met with in this land with its strange mixtures of the mediaeval and the modern.

In 714 patients, only one eye was operated on; in the remaining 268, the cataract was extracted from both eyes, either at the one sitting, or with a few days/

days intervening. These 'operated on' eyes, apart from a not infrequent conjunctivitis, usually of a mild type, were naturally what one might call normal cataracts, practically without exception. Nevertheless, in 16 of them, the lens was dislocated, and in 6, there had been a preliminary iridectomy. In the 714 unoperated on eyes, the general findings were as follows:-

Normal eyes (with or without unripe cataract)	-	523
Previous extraction . . . . .	-	96
Couched Eyes . . . . .	-	68
Destroyed Eyes . . . . .	-	12
Dislocated Lens . . . . .	-	5
Glaucoma . . . . .	-	10
		<u>714</u>

We will touch on the subject of abnormality again; in the meantime, with regard to the type of operation performed, the vast majority were primary capsulotomy<sup>1</sup> without irrigation; 70, however, were done by the/

<sup>1</sup> "A terminological definition is here desirable. The division of the capsule should obviously be known as capsulotomy, but this term has by usage been appropriated to the operation of subsequently needling opaque residual capsule. The term cystotomy and cystitome are in general use for the division of the capsule and the instrument it is performed with, respectively, at cataract operations, though the minority of cataracts (Morgagnian) can only properly be described as cystic. Throughout this book 'primary' cystotomy denotes division of the capsule with the point of the knife between the acts of puncture and counter puncture. 'Secondary' cystotomy, division of the capsule as ordinarily practised after the completion of the corneal section."

the Smith intracapsular method. The results achieved by that method were hardly of such a nature as to make one proud of them; despite this, I have not the slightest doubt that, for a hospital dealing in numbers such as Bamdah goes in for, this is the operation of choice. Newman,<sup>1</sup> however, seems to me to be right when he says that if your numbers are small, then capsulotomy, with or without irrigation, gives the best results. Smith likens the man who tries to do his operation without previous tuition, to the violinist who would learn to play his instrument without a master. That being so, we felt it advisable to defer further experience of this procedure to a more convenient season.

If, in the course of this paper, I may seem to deal somewhat extravagantly in figures and tables, I would crave the indulgence of my readers. It always was exceedingly exasperating to buy a new book or read a special article to find that the one thing necessary for a chartless man, who was laboriously making out his own maps and rules, - as every man must, - viz. figures, was always most conspicuous by its absence. A welcome exception is the annual report of the Ophthalmic Hospital, Madras. May the tribe of such increase! I trust also the figures given in that report have been the despair and envy of more than/

1. 'Irrigation in Cataract Extraction'. E.A.R. Newman, p. 4.

than myself; otherwise, this present effort will, I am afraid, be accounted of little worth.

The operation, by which, as mentioned before, the vast majority of the cases were done, was primary capsulotomy, somewhat after the fashion of the Madras School, only at Bamdah, instead of doing the capsulotomy with a needle, then making the corneal section - as at Madras - the pricking of the capsule was done at the same time as the section, by interrupting the knife in its passage across the anterior chamber, causing it to make a few longitudinal slits in the capsule, then completing the section as usual. Aqueous escape was exceedingly rare as was also involuntary iridectomy; these, when they did occur, only happened with a very shallow anterior chamber; to prevent such accidents, the usual secondary capsulotomy was done in all eyes with such chambers.

That this method has something to commend it may be judged from the fact that in 300 consecutive extractions in February and March 1925, there was not a single case of escape of vitreous. This immunity from that bugbear of cataract operation I put down firstly to the fact that, when a patient squeezes his eyelids together after the section and causes an escape of vitreous in the ordinary secondary capsulotomy, with a primary capsulotomy and the same manoeuvre, he only squeezes the lens out of its capsule, /



capsule, and secondly some of our immunity was due to the fact that, after the iridectomy, the speculum was replaced by a strabismus hook for the upper lid, and the thumb of an assistant for the lower as advised by Smith for his operation.

Appended is a specimen of the printed form used for each patient. It may look somewhat involved for a land like India, where one deals with so many patients per diem, but labour is cheap there, a clerk was easily procured, and he filled in the top part down to "date"; after that, by the use of abbreviations, the other lines were written in as the operator progressed.

On the results tabulated in these sheets then, we have based our thesis; needless to say, every part has not received the same attention; indeed, some sections have been favoured with none at all. The original idea, as a matter of fact, was to lay most stress on the operative and post-operative results, using the other data only where required to clarify and modify the findings there. For several reasons this was judged to be inadvisable, the most important being that although the vitreous escapes and sepsis figures, two of the great bugbears of the ophthalmic surgeon, had been brought down to reasonable proportions, prolapse of the iris had not; this, in the nature of things, was bound to be difficult in a hospital/

hospital like Bamdah, which was not so much a hospital as a caravanserai; yet, believing it possible, I could hardly embark on a thesis which proved only two thirds of what was desired to be proved when I believed that the other third was also capable of demonstration. Until this had been done one way or another, we felt that our attention had better be confined to the other matters treated of in the following pages. We shall, however, touch on this question again.

A few words as to the province of Bihar might not be amiss ere we proceed to the subject matter proper of this thesis. Bihar is divided up into three large Divisions, Patna, Bhagalpur, and Tirhut, which again are sectioned off into 11 Districts, with a population in all consisting of over 23,000,000 inhabitants, and an area about one third of that of the British Isles.

Annually, in this area, something like 4500 cataract extractions are performed by the various agencies at work - government, mission, railway, etc.; just what proportion this is of those available will come up for discussion in the next few pages. It is obviously a question of some importance.

The general outline of the thesis is as follows:-

Under the somewhat loose term "Etiology", we have included most of the data drawn from the headings 'Name',/

'Name', 'Number', 'Age', 'Caste', 'Address', 'Family History', 'Sex' of the case sheets.

'Condition of the Eye' has supplied little material to the thesis for two reasons:- (1) Although, on first appearances, the majority of Indian eyes appear to be suffering from conjunctivitis of varying degrees, closer inspection reveals that the conjunctiva is frequently as healthy as our own, and that trachoma e.g., though frequent, is not so widespread as one might at first assume.

(2) As we mentioned before, we had at first thought of basing this thesis on operative and post operative results, and it is obvious that, if this had been the case, then for sepsis figures the condition of eye before operation was going to be of some importance; these figures would have been of especial interest because in India, unlike home, a patient is often operated on the day he comes in unless his eye is showing fairly marked signs of conjunctivitis. Many of these eyes then are abnormal, giving evidence of slight trachoma, conjunctivitis, ciliary infection etc; to what extent were such eyes more liable to suppuration etc. than the others is only one of many similar questions awaiting an answer, but which, for the meantime under the circumstances, will not be touched upon.

'Appearance of Cataract' has been given a section to/

to itself, and needs no further explanation here.

'Tension' under the heading 'Operation' was thought interesting enough to be dealt with separately, and, as such will be found in the following pages.

'Abnormalities', i.e. at operation, vitreous escapes, number of instruments entering anterior chamber, difficulty or otherwise in delivery of lens etc. would have been of more interest if we had been dealing with operative results; they were however made use of occasionally.

'Nucleus', 'cortex', 'capsular incision', along with the three headings under 'appearance of cataract' were used in an attempt to make an operative classification of the various types of cataract.

'Type of patient' registered the good behaviour or otherwise of the victim under our care for the time being; used in conjunction with the anaesthetic instilled into the eye, it gave some rather useful findings which have been classed together under 'Anaesthetics'.

The stage having been set, the characters explained, our next move is to proceed with the play itself.

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Anaesthetic.

## CATARACT.

Operation. R.  
L.

Name

No.

Age

Caste

Address

F. H.

Sex.

RIGHT.

LEFT.

Since when could not see clearly.

Since when could not count fingers.

Diagnosis.

Date.

CONDITION OF EYE.

Lid.

Cornea.

Conjunctiva.

Ant. Chamber.

R. L.

APPEARANCE OF CATARACT.

Colour.

Marking.

Capsule.

OPERATION.

Tension.

Capsular Incision.

Abnormalities.

Nucleus.

Cortex.

Type of Patient.

AFTER OPERATION.

Remarks.	Conjunctiva.	Ant. Chamber.	Ant. Chamber.	Conjunctiva	Remarks.
			3		
			7		
			10		
			14		

VISUAL RESULT

WHERE STAYING.

DATE OF DISCHARGE.

REMARKS.

A G E.

Taking up to begin with then the question of age, the first investigation in this connection has been in the direction of seeing how the age incidence in India over a large series of cases compared with that at home. For this purpose we were fortunate enough to get the necessary data concerning 165 patients operated on by Dr A.H.H. Sinclair in Wards 41 and 42 of the Royal Infirmary, Edinburgh. We thank him here for his courtesy in giving access to those figures. The Indian statistics were our own, and another series which appeared in the Indian Medical Gazette around 1902.

The tables (Tables I, II and III) speak for themselves; the figures from Edinburgh do not need any elucidating, those for Bamdah and in all probability for Saran also are only approximate. The average Indian, when asked his age, seems rather surprised at such a question, as he considers that you, who are looking at him, ought to know more about the matter than he does. Consequently, with a fair number of exceptions, the figure put down under the heading 'Age' was one ending in 5 or more often 0, hardly such accurate work as at home, but the best possible under the circumstances, and I think, on the whole, quite trustworthy enough to base a series of/

of statistics on the findings when one is dealing with such large numbers as we have in India.

It will be seen that the peak of the home curve is reached at 70 years, whereas the Indian peak occurs at 50-55 years, a discrepancy of 15-20 years, which is much too big to be explained away by any slight inaccuracy of the Indian results, so that I think we may take the figures as they stand.

Another interesting observation is the large number of people in India below 50 years of age who are afflicted with cataract. At home, cataract below 50 is deemed to be of the non senile variety in the vast majority of cases<sup>1</sup>; out there, cataract in anyone over 30 or 35 is classed as senile, unless there is evidence to the contrary, once more giving us a difference of 15 - 20 years.

Looking around for an explanation of this difference, I think we have it in the fact that the Indian matures so very much more rapidly than the Britisher, and so correspondingly sooner shows signs of senility. It is no unusual thing for marriage, especially on the woman's part, to take place at 12 years of age, so that four or even five generations living at once, although extremely rare here, is not by any means a rarity in the land of Hindustan. This, more than any other factor, is probably responsible/

1. 'Diseases of the Eye' 1918. Parsons p. 292.

responsible for the early incidence in India, and it is an interesting thought that the early incidence itself may be the reason for the reputedly greater number of cataracts in the land, although, of course, if we are using cataract and senility as synonymous, then, to be consistent, we must admit the possibility of death supervening earlier than in this country, so this argument hardly holds.

One has to remember in this connection however that the majority of Indian cataracts are nuclear, whereas European cataracts are mostly cortical. Nuclear cataracts are said to occur earlier than cortical,<sup>1</sup> whether this is the case under equal conditions is another matter, but our data given here would seem to show that age for age, an Indian is 10-20 years older than his European brother born at the same time, a somewhat Irish statement, but, nevertheless, like many such, sufficiently clear not to need further elucidation.

CONCLUSION. (1) The incidence of senile cataract in India is greatest from 50-55 years of age as compared with 70 years for this country; (2) this discrepancy is in all probability due to the social and economic life of the people, especially to that custom which permits of child marriage.

1. 'Diseases of the Eye', 1918. Parsons, p. 294.



C A S T E.

Nowhere else in the whole world except in this strange and fascinating land do we find an institution such as this, an institution which has been at once a blessing and a curse to the land which originated it.

And nowhere else, except in this land, could we find in one village at one time, in all its thousands of villages, such tremendous social distinctions as are part of the every day life in India, distinctions, which affect at one and the same time every aspect of a man's being.

Here we have the lordly and haughty Brahman, the priestly class, elect of the earth, then come the scarcely less haughty and proud warrior caste, the Rajputs, then, at a considerable distance, come the ordinary people, the farmers, the merchants, the better class artisans, and, last of all, separated by a space so immeasurable that it is beyond human power to estimate it, come the outcastes, the unclean, sixty million of them, more base born than dogs, not fit to be mentioned in the same breath as the Brahman, yet made in the same form as he is, and suffering from the same diseases, all four sections clear cut and demarcated/

demarcated as by some giant axe, and, taken together, forming an alluring subject for the study of the incidence of disease as affected by the manner of living of a people.

Sun, rain, and wind, common to all, economic factors different in all, the question we at once want answered is: "Do these economic factors have any effect on the incidence of cataract among the various castes?" Diet has been blamed for cataract.<sup>1, 2.</sup> Does the fact that the Brahman is a vegetarian, a total abstainer from alcoholic liquors, - in theory at least, - make him less liable to such a disease as cataract than his outcaste brother, who eats what he can get, preferring meat to anything else, when it is available, and drinks what he can? On the same lines: "Do the meat-eating Mohammedans suffer more or less than the Hindus who as a whole are vegetarians?" and so/

1. "The nature of the diet has been suggested as a cause. Based on McCarrison's researches on the pigeon, the theory has been brought forward that cataract may be due to vitamine deficiency."  
'Cataract and its Treatment'. H. Kirkpatrick, p.25.
2. "Its (Cataract's) extreme prevalence in certain localities - the plains of N.W. India - and its relative absence in other parts of that country help us little. Where it prevails, the diet is chiefly wheat, maize and peas with rice fats; where it does not prevail to the same extent, as in the Himalayas, Bengal, Burma etc., the chief articles of diet are rice, maize and peas."  
H. Smith. Lancet 1922. CCII. II. 223.

so on, in a long procession, come the questions, questions which, in this country, would have been answered long ago, but, in India, with its scarcity of workers and the vastness of its needs they have to go too often unsolved.

Table IV gives an analysis of the figures obtained at Bamdah relating to this question. Some little explanation is probably needed to make it clearer.

In the table itself there are 8 divisions, subdivided up as seen. Under high caste, we have included the Kayasth or writer class; they have been put here because, despite the fact that genealogically they belong to the 3rd great division of the Hindus, i.e. the lot next the outcastes; they, by their education and the influence they exert, more resemble a high than a low class Indian, at least so far as a European is concerned, although the average Brahman, naturally, would by no means agree with our classification.

It will be seen that our total here only comes to 756, instead of 1011; this is explained by the fact that we only included in our list castes with 15 representatives and upwards with the exception of the outcaste or Semi-Hinduized Aborigines, where by reason of the paucity of their numbers, we had perforce to include the representatives of the two most numerous castes, namely, the Dosadhs, a thieving caste, and the Chamars, or/

or leather workers: that this is quite fair, however, to that section of the community is shown by the fact that there are in Bihar 3,366,759 Semi Hinduized Aboriginees, and this total sent us 34 representatives; the Dosadhs and Chamans, both Semi Hinduized Aboriginees, with 2,071,768 members, sent in 19, so that the proportions are correct.

Kurmi and Koeri have been written down as agricultural castes; this is true, but, as it is also true of over 90% of Indian inhabitants, no matter their caste, these two castes cannot be said to be very distinctive. The average Indian, whatever his caste and whatever his occupation theoretically may be, spends a good many months out of every year on the land. India is essentially and above everything an agricultural nation, and this fact has, I think, to be kept in remembrance.

Dealing first of all with the Hindus as compared with the Mohammedans, it will be found that, in the district under review, the former totalled 19,320,398 to the latter's 3,212,862, a ratio of approximately 6 : 1. Our cataract figures were:-

Hindus	848.
Mohammedans	157

An approximate ratio now of 11 - 2  
i.e. the Mohammedans relatively outnumbered the Hindus slightly. When, however, we remember that of the total/



total 19,320,398 Hindus, 3,366,759 were Semi-Hinduized Aborigines and hardly Hindus at all, then the tables are changed, and the Hindus slightly outnumber the Mohammedans, so that, for the present, all we can say here is that the incidence of cataract among Hindus and Mohammedans appears to be much the same.

A somewhat similar section of this investigation which gave rather disappointing results was that dealing with the aboriginal tribes of which there are a large number in Bihar, mostly Santals in the Santal Parganas, a reservation set aside for their benefit. The mode of life of these ancient forest people is so different in many ways from that of the average Indian in its freedom and lack of artificial restrictions, that it was felt that here, if there were anything in the theory that diet and manner of life are factors in the causation of cataract, some proof should be found. Hospital figures, - 4 Santals in 982 patients under review - seemed to favour the idea that they were less prone to this disease than their Hindu and Mohammedan brethren, but census figures did not bear out this contention, and personal communications with doctors working in this reservation<sup>1</sup> seemed to show /

1. The figures given by the Civil Surgeon of Dumka (capital town of the Santal Parganas) for cataract patients according to religion were:

Hindus 69.49%. Mohammedans 8.48%. Santals 22.03%.  
and by Dr Bogh, a Medical Missionary at Benagaria in the Santal Parganas were:

Santals 22%. Other Races 78%.

show that they were very like the other inhabitants of India so far as their liability to cataract was concerned; here again then our results are more negative than positive.

Coming to deal with the Hindu figures in detail, we find the results to be somewhat varied, the figures ranging from 165 cataracts per million inhabitants in the case of the Kayasths to 10 per million among the Semi-Hinduized Aborigines, with an average for the rest of the population ranging between 63 and 115, with the exception of the Gowalas, the cowherd class. These results, I think, will bear a little investigation.

The first and natural tendency on looking over these figures is to assume that the Semi-Hinduized Aborigines suffer less than the other classes from cataract and the fact that literacy, while 29% in the Kayasths, (highest) is only 0.23% (lowest) among the Semi-Hinduized Aborigines might be taken to prove our contention, or at least to give us a cause (factor of eye strain) for the very much higher percentage among the Kayasths; before taking up this assumption, however, let us see what the Census reports have to say on blindness in relation to Caste.

"On the whole, the high castes suffer much less from blindness than other classes of the community ---  
----- . As a general rule, the castes, with the largest /

largest proportion of blind persons, are of low social status." <sup>1</sup>

"The caste statistics are, as has already been explained, incomplete, and no very definite conclusions can be drawn from them. It seems probable that the higher castes suffer less from blindness than the other classes of the community." <sup>2</sup>

These census reports admittedly are talking of blindness as a whole without special reference to any one form of it, but I think it is generally recognised that after middle age, cataract is the one great cause of blindness.

"Blindness is essentially a disease of old age. Comparatively few persons suffer from it in infancy and early childhood, but the number increases steadily up to the age of 60. After that age blindness becomes far more prevalent, the proportion of persons who are afflicted with it being 6 times as great as it is between the ages of 15 and 60. Of the total number of persons who are blind, half are over 45, and one third are over 60 years of age. These figures support the general view that cataract which generally comes on late in life, is one of the most common causes of blindness." <sup>3</sup>

We/

1. Census of India Report 1911. I. 354.

2. " " " " " " 212.

3. " " " " " "

We can now fairly assume that half at least of the blindness figures in the census tables is due to cataract, and that the caste totals for blindness, given in the Census Report, although not absolutely correct for cataract also, are relatively so at any rate.

Looking once more then at our totals, we find that the incidence among Brahmans and Rajputs, as shown by attendance at hospital, is slightly less than the incidence among the higher class lower castes, Kayasths, Sonars, Teli, Kahars, etc.; this is in accordance with the census figures. The fact too that the incidence is highest among the Kayasths, who, of necessity, use their eyes a great deal, agrees with the findings of the Census Reports<sup>1</sup> for other castes like Darzi (tailors) and Lohars (blacksmiths) who also make much use of their eyes. When, however, we come to the lowest caste; those in fact with no caste at all, there is a sudden transformation from round about 80 down to 10 per million, and the Gowalas, low caste cowherds, are not much better at 20 per million.

If/

1. "Castes like Lohar and Kamar (blacksmiths) and Darzi (tailor) whose occupations are exacting to the eyes have a larger proportion of blind than the agricultural or forest tribes whose work keeps them in the fields or jungle."



If we assume, as I think we have a right to, seeing we have their blindness figures, that the cataract incidence is at least as high here as in the other castes, say 100 per million, then it is fairly obvious that for some reason or other, large numbers of the outcastes prefer to spend their lives in blindness rather than come to the European hospital for relief. Why this should be so is rather difficult to say, unless it be just from their very illiteracy and ignorance. Such people are usually the last to grasp at new ideas, no matter how good those ideas may be, and there is no reason why India should be an exception to the rule. Again, these people have been despised and looked down upon for such countless centuries that the idea that anyone will really put himself to the least trouble for them dawns on their consciousness very, very slowly. That this theory is more than plausible is borne out by the fact that 9 out of our 19 Dosadhs and Chamars came from Monghyr District itself, i.e. they doubtless had heard or seen Dr Macphail on one of his many tours through the country, and in their hour of need, they had repaired to the hospital of the doctor who cared even for such as they.

When we remember that there are 3,366,759 Semi-Hinduized Aboriginees in Bihar, and another 2,765,844 Gowalas, whose condition is little better we will see that this problem is one of some economic importance as/

as here we have a population of 6,132,603 souls among whom - judging by the number blind per 100,000, (Table IV) - the incidence of cataract is probably highest, yet who avail themselves of the services of the hospitals to the extent of less than one sixth of their more fortunate brethren, i.e. if we put the number of cataracts per castes as coming to Bamdah at 100 per million, then the Gowalas and Semi-Hinduized Aborigines send only 15 per million, but as the total number of cataract operations for the whole province per annum is nearly four times that being reviewed here (4,500 - 5,000 compared with 1250), the respective figures would be 400 and 60 per million, i.e., a difference of 340 per million, giving us in a total of over 6 million, some 2000 cases undealt with, and even in India, with its vast numbers, this is by no means a negligible figure.

CONCLUSION. The first impression one would record is that to be of any value, hospital and census figures must be taken together, hospital statistics alone being apt to lead to very erroneous conclusions.

We should also stress once more the varying cataract incidence, among the different castes, high castes, represented by Brahmans and Rajputs, occupying a middle position between the better class artisan castes and the outcastes.

Thirdly/

Thirdly, the necessity which the figures just given, have shown of the need for some scheme whereby it might be brought home to the outcastes of India that cataract is a curable disease; till this knowledge is imparted to them by education in the schools, propaganda, and any other means available, the Indian Empire will annually continue to suffer a needless economic loss.

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L O C A T I O N .

Table V will show the data at our disposal from which to draw conclusions one way or another for the purposes of this section. Before proceeding to clear up any points in it which might not be too obvious at first sight, we will ransack once more that storehouse of information, viz. the Census Reports for India and see what they have to say regarding the effect of location on the incidence of cataract.

"The prevalence of this infirmity (blindness) varies inversely, with the rainfall ..... it must be remembered however that in the provinces where the affliction is most common, there are other contributing causes; the winter months are cold, the houses are built with thick mud walls and are very badly ventilated, and much harm is done to the eyes by the bad air and the thick smoke from the fires at which the people cook their food."<sup>1</sup>

"As a general rule the caste with the largest proportions of blind persons are of low social status, but the same caste is seldom afflicted in more than one province ..... the inference is that it is the local conditions and way of living which conduce to blindness rather than any racial predisposition. In/

1. Census of India Report 1911.



In support of this conclusion it may be noted that in Assam three aboriginal tribes resident in the hills have relatively more blind persons than any other section of the community, while another similar tribe living on the plains has the smallest proportion of all".<sup>1</sup>

We have here then the rather interesting suggestion that the incidence of cataract varies according to the rainfall in a district. The inference in the second paragraph quoted that it is the local conditions and way of living which are responsible for the prevalence or otherwise of this disease seems too general in its findings to be of much use.

The figures in Table V were compiled from two sources as seen in the columns, one from Bamdah, the other from the numbers kindly given by the Civil Surgeons of the various districts concerned. These latter figures, unless where otherwise stated, are for all the hospitals in that area, and, taken in conjunction with the Bamdah figures, give, I think, a sufficiently accurate idea as to the numbers of cataract operations performed per annum in the respective localities under discussion.

Several facts stand out clearly when we study this data.

The first is the discrepancy between the figures for/

1. Census of India Report 1921. I. 212.

for Patna and those for the other districts.

Next we are rather surprised to note, remembering that Bamdah accounts for one-third of all the cataract operations done in Bihar, that Monghyr, the district in which Bamdah is situated, is only third on the list so far as number of operations per head of population is concerned.

Thirdly, it will be noted that the figures for the Western districts are much higher than those for the Eastern sections of the province, and also that the places North of the Ganges, which divides Bihar into two parts, seem to suffer much less from cataract than those south of the river.

Discussing those results in detail, we will first of all deal with the figures relating to the district of Patna. To begin with, the town of Patna, with its 119,976 inhabitants, ranks as one of the big cities of India, and, as such, will always attract to its hospital a certain number of people from the smaller towns of neighbouring districts, yet this does not nearly suffice to explain the difference between the figures for this and the other districts, as it will be seen that we, 120 miles away, had nearly 400 cataract patients from Patna in the year. The Census Reports too have taken stock of this by noting that Patna and Shahabad have more blind in relation to population than the other districts. They are inclined to ascribe this to the fact that Patna lies to the west/

west of the other areas nearer the heat and dryness of Central India. This seems the most plausible reason since Monghyr, as we saw had only one-third as many cataract operations per head as Patna, yet one would suppose that here, if anywhere, people with cataract would come for operation. The incidence, as we might say then, of operations will be as great in Monghyr as in Patna, yet the cataract incidence in the latter district is at least three times as high. That the 1100 odd patients from Patna are chiefly natives of that district, and not foreigners from elsewhere to any large extent may, I think, be admitted when we remember that Bamdah alone does nearly 400 per annum from the Patna area.

We are forced to the conclusion then that the reason for the difference in figures between Patna and the other districts in general, and Patna and Monghyr in particular, is not because of varying hospital facilities but rather, because the incidence of cataract itself varies considerably.

This leads us on to our third consideration which has already been half answered, viz. the reason for the difference in the figures between East and West, and North and South respectively. The writer of the Census Report, previously referred to in this section, thinks that proximity to Central India affects the prevalence of cataract, and, apart from the figures of/

of the districts mentioned here, the province statistics appear to prove the same thing, as blindness figures fall from 256 in the Central Provinces, 183 in Central India, 82 in Behar and Orissa, to 72 in Bengal, a steady diminution as we proceed from the Central Plains to the sea.

The other theory raised, viz. that the prevalence of blindness varies inversely with the rainfall, finds little direct support here as all the districts under review have an annual rainfall of approximately 60 inches with a mean annual temperature of about 80°F. In fact, so much is the contrary the case that Patna is one of the richest and most fertile provinces in India, and one of the few which has never had a famine of any real dimensions, so that it is not so much the rainfall which affects the cataract incidence as the proximity to vast dry, sandy stretches. This, too, would explain the much smaller incidence in Bengal, compared with those provinces which have no sea board of their own as breezes from the sea are hardly likely to have the same effect on the eyes as a wind which has come straight from the hot arid stretches of a great sandy plain. The reason for the difference in the figures of the districts north and south of the Ganges is rather hard to find; beyond hazarding the opinion that the decreased prevalence in/



in the north may be due to the proximity of the Himalayas,<sup>1</sup> we feel our data here is too meagre even to allow of a discussion of the question.

CONCLUSION: (1) The incidence of cataract varies in a surprising manner not only from province to province and from division to division, but even from district to district. (2) The prevalence of the disease in a given area is in direct proportion, other things being equal, to the distance of that area from the sea. (3) Proximity to the Himalayas appears to result in a lessening of the incidence of cataract in that area.

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1. Vide ante. p.17 for H. Smith's opinion concerning the incidence of cataract and proximity to the Himalayas.

HEREDITY.

Out of 982 patients operated on, 125 or 12.63% gave a history of cataract in either parents or children in the following proportion:-

Father	35
Mother	52
Brother	26
Sister	9
Son	1
Daughter	1
Grandfather	1
Total	<u>125</u>

These figures seem to me to prove little or nothing. In a land where, according to one of my Indian informants, "Everybody got cataract", it can hardly be wondered at that 8.83% of our patients gave a history of cataract in either father or mother.

Kirkpatrick says:<sup>1</sup>- "A hereditary predisposition to the formation of cataract is fairly generally admitted, and numerous observers have recorded instances in which successive generations have been affected by disease. Anticipation or the appearance of/

1. Cataract and its Treatment. H. Kirkpatrick. Chap. III, p.18.

of the disease at an earlier age in succeeding generations has occurred in some cases, and the writer recollects one such in which a Hindu woman, aged 20 years, whose mother had been operated on for senile cataract a few years previously, developed a presenile cataract in each eye and brought with her to hospital her three children, the eldest being 6 years old, all of whom were affected by double cataract." This only tends to prove presenile cataracts are hereditary.

Quoting the same writer again:- "The observations of Priestley Smith upon 156 lenses obtained post-mortem, show the influence of senility on the causation of cataract. Between the ages of 20 and 49, no single instance of any opacity was met with among the 66 lenses examined; between 50 and 59, 2 lenses out of 22, i.e. 9% presented cortical opacities at the equator, between 60 and 69, 9 out of 32, i.e. 28% were affected. Similarly, or to a greater extent between 70 and 90, 34 lenses were examined, and, of these, no less than 16, i.e. nearly 50% were affected in like manner."<sup>1</sup>

When we remember that the age period 70-90 at home corresponds closely to 50-70 in India, one is more than ever inclined to think that, although heredity may play a part, it is an exceedingly small one, /

1. Cataract and its Treatment. H. Kirkpatrick, p. 22.

one, and that the lay writers of the census report are not far out when they put cataract down to the effect of glare and dust, manifesting itself in senile eyes in this way plus some contributing factor, which they incline to think is smoke and bad ventilation, but which may very well be anything tending to produce an enfeebled state of health.

The general concensus of opinion, however, among cataract operators of wide experience seems to be that it is hereditary; Maynard's figures<sup>1</sup> certainly appear to point that way, and figures are probably a rather more valuable contribution to the solution of the problem than opinions alone. The figures for Bamdah too might be held to point in that direction, but, in a land like India, 9% and even 24% cases with a family history are hardly sufficient to prove the matter conclusively. With regard to the discrepancy between the two sets of figures, it must be remembered that Maynard was ophthalmic surgeon in Calcutta, where there have been operators and a surgical school for 100 years; in that time, thousands of cataract extractions have been done; these patients have returned home, the whole/

1. Manual of Ophthalmic Practise.  
F.P. Maynard. p. 53. (History of cataract in father or mother in 24% of 500 patients who came for extraction of cataract).



whole village heard of the matter, and the whole village silently noted it in their own minds. Twenty years later, the next generation began to be afflicted with cataract; some "tholed" it, others resorted to the vaidyans, and still others went to Calcutta.

I think it is obvious that among the number resorting to Calcutta would be those whose fathers and mothers had previously gone there. That family did not necessarily suffer any more from cataract than the others around it, but they had established a family tradition that cataract, when it appeared, would be operated on at Calcutta, and thither they went.

Bamdah, on the other hand, was only started in 1889, and more than ten years elapsed before the numbers done yearly were at all appreciable. I think this explains the discrepancy to a certain extent at any rate.

Taking into account then Priestley Smith's figures proving that over 50% of the lenses examined (post-mortem) in people over 70 years of age showed opacities to be present, looking at the graph given in the 1901 Census Report<sup>1</sup> which shows that between 30% and 40% of all blindness occurs in individuals over 60 years of age where it can hardly be due to anything else but cataract, I think we might state that senile cataract, as its name implies, is essentially a disease of old age, that my Indian friend was not so far wrong when he/

1. Census of India Report. 1901. VI. 289.

he said everybody got it, that, judging by the graph and the above figures, it seems only a question, so far as India is concerned, as to which will cease first, the whole vital processes of the body or the physiological clearness of the lens, so that from these figures at any rate we cannot talk of cataract as being hereditary, although it is most probable that, as Kirkpatrick states, we have anticipation, due perhaps, shall we say, to a cataract diathesis.

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S E X.

In a total of 1011 patients, who came for operation with ripe cataract in one or both eyes, the women numbered 376, and the men 635, i.e., a proportion of 4 - 7 in favour of the men. This is, I think, the usual finding, viz. that women patients in India at any rate, number less than men. The question then becomes, "Is this disparity in numbers due to a lesser incidence among women, or is it the result of the economic and social position of the Indian woman preventing her taking advantage of hospital facilities to the same extent as her male relatives?"

If we take up the plea that the smaller numbers are due to decreased incidence of the disease among women, we can put forward quite a strong case in its favour, but I think the stronger claim must be made for the opposite contention, viz. that cataract is relatively and absolutely more frequent among women than among men because (1) home figures prove this to be the case, as shown in Table I; (2) census results point the same way, and (3) in an investigation we made at Bamdah concerning the family history of our cataract patients, in 35 cases, there was a history of the father having had cataract as compared with 52 where the mother had been afflicted with the same disease. The first cause thought of to account for the discrepancy/

discrepancy between the sexes is the pardah system with its seclusion of women. That this factor operates among the upper classes is, I think, unquestionable; that it operates to any extent among the outcastes and the lower castes is a very much more debatable point, as the women in these latter sections of the community live lives which are practically as free as those of their male relations. The figures for the Brahman and the outcastes are 94-45, and 21-13 (Table VII) for men and women respectively, i.e. on an average, less than one Brahman woman comes to hospital for every two men whereas, among the Semi-Hinduized Aborigines, practically two women come for every three men, showing that pardah restrictions do exercise an effect, but not a very marked one, and that we must look elsewhere for a reason for the difference between the sexes.

A glance at Tables VI and VII will show how the figures for operations performed in the various areas compare; in all, with one exception, the men outnumber the women in the proportion of more than 3 - 2.

We have to remember in our discussion that after all this is the East, and of still more importance, that it is India. Where pardah restrictions do not operate and in the class of patient with which we deal, they are not on the whole of great account, as we have seen; then all the woman's duties and life have centred round the home much more than the man's, so that, /



that, when, at 50 years of age, she finds herself afflicted with curable blindness, she is much more loath than her brother or her husband, under the same circumstances, would be to leave home for hospital.

As bearing out the difference between men and women in this respect, we have the following from the Census Report.<sup>1</sup>

"An interesting inquiry which was made in 46 villages showed that less than one in 4 males and less than one in ten females of these rural tracts had visited any of the important and attractive centres as Patna, the capital of the province, Calcutta, Gaya, or Puri."

It is rather interesting to note in this respect that if we divide 52<sup>\*</sup> by  $\frac{4}{10}$ , the answer 20.8, when compared with 35,<sup>\*</sup> gives the fraction  $\frac{4}{7}$  approximately, so too do the figures 376 and 635, so one might almost lay down the rule here that we would have to multiply the female total by  $\frac{10}{4}$  ( $2\frac{1}{2}$ ) before we were even operating on the same relative percentage as in the male. This for Bamdah gives us a figure of 940 women instead of 376; somewhat far fetched perhaps, but interesting.

It/

1. Census of India Report 1921. I. 23.

\* 52 and 35 it will be remembered, were the numbers in which a history of cataract in mother and father respectively was obtained. p. 38.

It might be argued that the effect of travelling on women could be found by comparing the statistics for the far away districts with those near by, i.e. the farther away the district, the smaller percentage of women operated on, and vice versa. This comparison, however, results in no definite conclusion beyond bearing out one of the findings of the Census report that cataract is more prevalent among women in those districts where it is most abundant.

The foregoing figures go to demonstrate yet another section in the large number of cataracts which are unoperated on every year in India. If we reckon that 4500 extractions are done annually in Bihar, then of these 2700 will be in men and 1800 in women, but we have just shown that cataract is commoner in women than in men, therefore 900 cataracts in women are unoperated on yearly in Bihar alone; that there are more than this is obvious as we have assumed that all the cataracts in men are extracted which is very far from being the case, but the figures for those women who remain blind, are sufficiently large as they are to merit considerable attention.

CONCLUSION: (1) Cataract is more prevalent among women than among men. (2) The number of cataract operations performed on women is very much less than the number performed on men.

(3) The reluctance on the part of Indian women to submit to operation for cataract, is the cause of considerable loss both to the State and to their families annually.

GENERAL CONCLUSION.

Only a few lines are necessary here to gather together the lag ends of the various sections under 'etiology'. It will be seen first of all that we have fulfilled our promise and found nothing new with regard to the causation of cataract. Senility, rainfall, effect of glare and dust, diet, and a hundred and one other things, have all been discussed before, and will be again. What has emerged, however, in the direction of statistics concerning the incidence of cataract and the number of operations performed among the Outcastes, and the Women of Bihar, is, I think, of some value, and as such will be dealt with in the general discussion at the end of the thesis.

As Kipling has it:

'There are nine and sixty ways of constructing tribal  
lays

And every single one of them is right.'

and perhaps the same is true with regard to the causation of cataract.

-----

TABLE I.

## AGE AND SEX FIGURES, R.I.E.

Age Period	Women Operated on	Men Operated on	Total
50	7	2	9
55	7	2	9
60	19	17	36
65	18	14	32
70	19	20	39
75	15	10	25
80	4	9	13
85	1	0	1
90	0	1	1
Grand Total	90	75	165

Explanation. For purpose of comparison it was deemed better to arrange the figures as above, rather than under each separate year of age.

48-52 incl. = 50

53-57 " = 55 &c.



TABLE II.

## AGE FIGURES, BAMDAH.

Age Period	Patients	Total
30	12	
35	14	26
40	166	
45	65	231
50	353	
55	48	401
60	195	
65	35	230
70	26	
75	8	34
80	3	
85	2	5
	Grand Total	927 *

\* Age was not ascertained in the remaining 55 through bad note-taking.

TABLE III.

## AGE FIGURES, SARAN DISTRICT.

Age Period	Operations Performed.
30-35	21
35-40	70
40-45	239
45-50	341
50-55	350
55-60	237
60-and over	226
Grand Total	1484

Extract from I.M.G. 1902. Cataract Extractions  
in Saran District 1891-1900.

Captain R.H. Maddox.

TABLE IV.

## CASTE FIGURES, BAMDAH.

CASTE.	POPULATION.	CATARACTS.		LITERACY.	BLIND PER 100,000
		No. Operated on.	No. Per Million		
High.	( BRAHMANS ) ( and ) ( BABHONS. ) ( ) ( KAYASTH ) ( ) ( RAJPUT )	165	82	163,118	666
	285,780	47	165	97,635	828
	1,075,461	68	63	119,580	822
Merchant.	( TELI ) ( ) ( KURMI )	49	79	27,687	1000
	730,930	79	107	38,912	933
Agricultural.	( KOERI ) ( ) ( KAHAR )	50	45	29,885	909
	1,118,905	33	84	8,187	1531
Household.	( SONAR ) ( ) ( HALWAI )	19	113	-	1061
	167,788	16	115	-	
Artisan.	( ) ( ) ( )	55	20	38,273	743
Pastoral.	( GOWALA ) ( ) ( DOSADH )	11	10	4,732	1469
Semi-Hinduised	( ) ( ) ( CHAMAR )	8	8	4,147	1071
Aborigines.	( ) ( ) ( )	157	50	-	800
Mohammedan.	MOHAMMEDAN (All types)				

TABLE V.

## LOCATION FIGURES, BAMDAH.

District.	Population	Extractions at Bamdah. <sup>1</sup>	Extractions at other Hospitals.	Total Extractions.	Extractions per 100,000 population.
PATNA	1,574,287	374	772	1146	73
GAYA	2,152,930	127	690	817	38
SHAHABAD	1,816,821	65	294	359	16
SARAN	2,339,953	45	318	363	14
CHAMPARAN	1,940,851	35	282	317	15
MUZAFFARPUR	2,754,945	75	41*	116	4
DARBHANGA	2,913,529	104	64	168	6
MONGHYR	2,029,965	392	97	489	24
BHAGALPUR	2,033,770	104	67	171	8
PURNEA	2,024,608	14	--	14	-- **
SANTAL PARGANAS	1,798,639	65	195***	260	14
GRAND TOTAL.		1400	2820 <sup>2</sup>	4220	

\* Only the figures of the Sadr (chief) Hospital given.

\*\* No reply to communication.

\*\*\* 116 of this total of 195 were done at the Mission Hospital of Benagaria in the Santal Parganas.

1. The Bamdah figures are corrected to approximate to the total number of extractions done in a year.
2. 2820 is obviously too small a total, as no reply was received from one of the districts, and another only gave the figures for the chief hospital. We propose therefore to add 280 to this figure, bringing the grand total for the province up to 4,500 and at the same time making up for any omissions in the district figures.



TABLE VI.

## SEX FIGURES.

DISTRICT	Number of successful operations for cataract during 1896-1900.	
	MALE.	FEMALE.
MIDNAPUR	198	48
RAJSHAHI	187	92
PATNA	567	319
GAYA	874	543
SHAHABAD	744	831
DARBHANGA	380	209
MUZAFFARDUR	218	93
BHAGALPUR	113	57
MONGHYR	303	170
TOTAL	3584	2362

Table extracted from Census of India Report  
1901, Vol. VI, p.288.

TABLE VII.

## CASTE AND SEX FIGURES, BAMDAH.

CASTE	MEN Operated on	WOMEN Operated on	Total
Brahmans	94	45	139
Other High Castes	96	47	143
Artisans	52	27	79
Agricultural	92	53	145
Pastoral	40	19	59
Trading	79	64	143
Household	35	34	69
Fishing	5	4	9
Semi-Hinduized Aborigines	21	13	34
Mussulmans	101	56	157
Santals	3	1	4
Various	17	13	30
GRAND TOTAL	635	376	1011

COUCHED EYES.

Couching we are informed, was probably practised as one of the finer examples of the surgeon's art in the third century B.C.; this was in Alexandria. To-day, in the twentieth century A.D., the East still knows of this operation, still practises it, and, if report be true, on occasion even invades the haughty sanctuaries of the West with this ancient relict of a by-gone age. The pages of the History of Medicine are full of romance, but one doubts if there is anything to surpass this theme of an operation cradled in antiquity which still holds its own in many parts of the world against all the skill of the Western surgeon. On a subject such as this, one longs for the magic touch of some wizard's pen to awaken in us something of a sense of wonderment and amaze as we gaze at an age so great, but, alas, wizards' pens are hard to obtain in this sophisticated age, so we must e'en pass on to other and more prosaic things, after those few lines of homage to such hoary age.

Coming to the actual operation itself as practised to-day in the East, Elliot's description of the steps in the procedure would probably be hard to surpass. They are as follows:-

"The patient and operator sit facing each other  
in/

in a good light, both squat on their hams, in accordance with the immemorial custom of the East. The patient is frequently, if not usually, told that no operation is to be performed, and that it is merely a question of putting medicine into the eye. He is directed to look backwards, and the coucher raises the upper lid with one hand, whilst in the other he conceals either a needle or a sharp thorn. It is said the long needle-like thorn of the babul tree is usually selected for the purpose. Many patients have mentioned that their heads were steadied by a friend from behind. In the majority of cases, at least, it would appear that no form of local anaesthesia is attempted. The operators appear to rely largely on manual dexterity, and to aim at completing the procedure in a minimum of time. The needle or thorn is thrust, suddenly through the cornea, and on through the pupil or iris into, or on to the periphery of the lens. The next movement, which appears to follow the first so rapidly as practically to melt into it, is that of depression or reclination. In this, the spot where the cornea grasps the shaft of the needle serves as a fulcrum. The operator raises his end of the instrument, and the opposite one, which lies either on the surface of the lens or embedded in it, is consequently depressed, thus carrying the cataract with it downwards or downwards and/





and backwards, and so clearing the pupil." <sup>1</sup>

The foregoing is a description of what Elliot calls the anterior operation; much of it also applies to the posterior where the point of entrance of the needle is 8 mms. out from the cornea, and 2 mms. below the horizontal meridian. In this variation the needle, after making the incision, is withdrawn, and a copper probe introduced by which the lens is depressed.

So much for the actual technique of the operation itself; one cannot however leave this aspect of the subject without mentioning the most interesting part of all, to quote Elliot again.

"There is a step of the procedure which has been purposely left to the last as its interest is psychological and not surgical. It is common to both methods of operation. I refer to the anointing of the eye with the blood of a freshly killed fowl. It is a measure in which superstition, cunning, self-preservation and greed overwhelm and mask a feeble therapeutic design. The sacrificial element is present and a hazy idea that the death of the votive bird may turn evil from the patient looms in the background. Next comes the need to mask the shedding of the patient's blood, since he is often told that no operation is to be performed, but that a mere medicinal/

1. Couching for Cataract. R.H. Elliot. p. 14.

medicinal application is to be made; the blood of the outraged bird covers the guilt of the vaidyan's falsehood. Largest of all towers the fact that the curry pot of a worker of surgical marvels needs constant replenishing, and that fowl is an excellent substitute for mutton on such occasions. Lastly, these men seem to believe that the coagulation of the fowl's blood helps to close the puncture.

In view of the dirty condition of the instruments which they introduce into the interior of the eye, this last factor may practically be neglected."<sup>1</sup>

So much for the operation; what about the operators and their instruments.

"By tradition and ancestral habit, the coucher is a wanderer on the face of the earth, and like the gipsy, he carries his wares, such as they are, to the very doors of the people's homes".<sup>2</sup>

"Their surgical equipment is carried in a bag or in a box, which would be considered dirty alongside of the tool chest or work basket of any English artisan. The filth alike of their clothes, their hands, and their person stagger description from a surgical point of view."<sup>3</sup>

Elliot gives various names accorded to these, our professional/

- |    |                        |              |        |
|----|------------------------|--------------|--------|
| 1. | Couching for Cataract. | R.H. Elliot. | p. 18. |
| 2. | "                      | "            | p. 19. |
| 3. | "                      | "            | p. 20. |

professional brethren, 'suttya', 'mal', 'rawal' and 'vaidyan', the last probably the best known of the lot. In Bihar, among the people themselves, the coucher appeared to be known as a 'Khayar', and as such specialised in the treatment of eye diseases alone. His fee however was considerably more accommodating than is usual among specialists as was evidenced by the fact that the usual price paid per cataract appeared to be one rupee. That there was nevertheless such a thing as varying degrees of skill among the Khayars was made obvious by the story of one fairly wealthy patient, who, to his sorrow, had gone to one of those men to have a cataract couched; the operation cost him 50 rupees and his eye, yet that operator remained some two months in the town and reaped the not insignificant sum of 2000 rupees in fees for his labours!

Such then is a short description of the coucher and his art. The obvious question which at once enters our minds, after hearing of the doings of such an individual, is a query as to the sort of results such technique obtains, for in the vast majority of cases, to give these men their due, their handwork, judging it merely as an example of manipulative skill, was excellent. Partially dislocated lenses were few and far between, and the great majority of eyes from/

from the cosmetic point of view were practically perfect. Elliot,<sup>1</sup> operating in Madras, also found this to be true; Smith<sup>2</sup> in the Punjab found the reverse to be the case.

Before giving our own findings as to the results obtained in Behar, it will, I think, be instructive to glance at the figures of other writers on the same subject. (Table VIII).

It will at once be seen that the results of couching are on the whole very bad. Haab, - Himley's 96% successes I am afraid we must discount - who was presumably giving European figures, quotes 40% failures; at the other end of the scale we have Holland of Shikarpur with his 95% going bad, and Smith who avers that all go this way if left long enough. Elliot's figures for the Madras Presidency appear to strike a sort of average between those two extremes. We personally were rather interested in what the results for Bihar would be, and will deal with that anon. In the meantime, a few remarks as to the reason for these extremely bad results might not be out of place.

Sepsis and glaucoma are of course the two most obvious sequelae one thinks of; accurate figures are rather hard to obtain except perhaps for glaucoma, as/

1. Couching for Cataract. R.H. Elliot. p. 16 & 26.

2. Treatment of Cataract. H. Smith. p. 23.



as the patient frequently comes to the surgeon years after he has lost his sight, when it may be a matter of exceeding difficulty to say just what was the initial cause of the sight being lost. Elliot gives the following from his series of 54 couched eyes which he enucleated and examined.<sup>1</sup>

Iritis and Iridocyclitis . . . . .	35.76%
Glaucoma . . . . .	11.05%
Imperfect dislocation of lens . . . . .	8.94%
Detachment of retina . . . . .	3.53%
Optic atrophy . . . . .	2.59%
Retinitis Pigmentosa . . . . .	0.49%
Retinitis Punctata Albescans . . . . .	
Retinochoroiditis . . . . .	1.41%
Vitreous Opacities . . . . .	1.18%
Failure due to operation on . . . . .	0.23%
a congenitally imperfect eye . . . . .	
Deficiencies in notes . . . . .	3.53%
	<hr/> 68.71% <hr/>

The remaining 30% or so were presumably undiagnosable. In view of the fact that sepsis plays such a large part in the causation of the all too frequently ensuing blindness, it would be interesting to know what figures these men would obtain if they exercised/

1. Couching for Cataract. R.H. Elliot. p. 28.

exercised even the most elementary of antiseptic rules. It is hardly the sort of thing one can enlarge upon in the scarcity of data regarding this subject, but the thought is an interesting one. The fact that a certain amount of European data is available is hardly relevant as most of this deals with pre-antiseptic times.

In the period under review, the total number of couched eyes seen at Bambad was 115; for the sake of accuracy, we propose to divide this number into two classes:-

I. In the first class, which totalled 68, the companion eye to that operated on by the Khayar had a ripe cataract; this was in all cases operated on by us.

II. In the second class, numbering 47, there were the following subdivisions:-

(a) Doubles (both eyes couched) 9	= 18 eyes	)	47.
(b) Singles (one eye couched)	= 23 eyes	)	
(c) 'Denials' (eye ob- viously couched but patient denied the fact. - - -)	= 6 eyes	)	

For various reasons, to be explained immediately, in none of these patients was an operation for extraction of cataract performed. As this class is the lesser in importance of the two, we will deal with it first.

II (a)/

II (a) The 'doubles' explain themselves; of these 9 doubles, it is interesting to note that 8 of them were done at the same time, no mean undertaking for both patient and operator in the absence of an anaesthetic. In the 9th - a man - there had been a difference of 5 years between the operations. His eyes had been operated on 18 and 13 years previously; in the former, he was altogether blind; the latter could count fingers at 2 ft. The other extreme from this was a man who had been done 4 months before. Vision when seen:- blind in one eye, fingers at 6 ins. in the other.

(b) These 'singles' in the majority of cases came for an operation in the other eye, and, in the dispensary, the couched eye was noticed. The uncouched eyes are almost all included under glaucoma, unripe cataract, previous extraction for cataract, and normal eyes. In several of those noted under glaucoma, it is interesting to observe that if the couched eye was like the uncouched eye seen by us, the Khayar had operated on a case of glaucoma instead of cataract. The most recent case was that of a man seen 20 days after operation, already suffering from irido-cyclitis, and having only perception of light left; he had the mark of the coucher's needle still very/

very distinct in the outer and lower quadrant of the anterior surface of the globe, hardly a good advertisement for the Khayar.

(c) This section of 6 consists of those who denied interference by a Khayar, but in whom the evidence seemed sufficient to prove otherwise. There were other doubtfuls also, but we have given only those where the diagnosis was practically certain. One's experience on the whole, with regard to this aspect of the matter, was that the majority confessed at once when charged with having gone to a Khayar; the prevaricators acted their part but feebly, and the 'die hards' were few and far between. This is deemed worthy of notice as a good deal is heard of the unwillingness of the people to confess to having had their eye couched, or as many of them put it, 'had medicine applied' by the Khayar!

The visual results of classes 1 and 2 are appended; they need little explanation beyond saying that the arbitrary standard of ability to count fingers without glasses at 3 feet and over was reckoned a success. This figure was taken because it was found that the average secondary cataract patient under similar conditions had difficulty in performing the same test successfully at a greater distance than 3 feet.



NORMALS.

(uncouched eyes operated on)

I.	Blind . . . .	24	-	37.5%
	Perception of Light	13	-	20.31%
	Fingers at 6" - 3 ft.	15	-	23.44%
	" " 3 ft and over	12	-	18.75%
		<u>64</u>	**	

ABNORMALS.

(uncouched eyes unoperated on)

II.	Blind . . . .	27	-	58.7%
	Perception of Light .	12	-	26.09%
	Fingers at 6" - 3 ft.	6	-	13.04%
	" " 3 ft and over	1	-	2.17%
		<u>46</u>	*	

A glance will suffice to show how bad those results are, especially in class II where only 1 out of 46 came up to our easy standard of success. That this class represents an undue proportion of the couchers failures is however, I think, fairly apparent when we remember that 9 patients, representing 18 of the 46, came to us solely on that account. The Khayar had/

\* No vision recorded for one patient.

\*\* No vision recorded for four patients.

had done both their eyes, they were blind or nearly so, and they came to us as a last hope to see if we could do anything to remedy their blindness.

Out of those 18 eyes, 11 were blind and one of the women who denied interference had also had both eyes operated on and was blind, making a total of 13 blind out of 20 eyes couched, i.e. 65%. The singles were also abnormal from the point of view of testing the Khayar's average results, as they numbered among them patients who had almost certainly had glaucoma mistaken for cataract, and others in which the unoperated on eye was normal or sufficiently unripe for reasonable visibility, so that here too, many had come to us as a last hope because the coucher had failed, and not for any operation on the uncouched eye. I have stressed this point at some length as it was on these grounds the distinction was made between classes I and II, which might more appropriately be called Normal and Abnormal respectively, from the point of view of the Khayar's results.

Taking the hospital doctors' figures as a whole, I think it may safely be said that we see an undue proportion of the couchers' failures. These failures have already been dealt with in Class II.

Turning to class I, it seems to me that this represents fairly accurately the average results obtained by the Khayars, at least in these regions, because:-

(1)/

(1) The results are distinctly better than those of class II (a somewhat ingenuous proof).

(2) These cases came to us as ripe cataracts, not as coucher's failures, partial or otherwise. All that they were interested in was that the cataract in the ripe eye should be extracted; that the other eye had been couched was, as it were, incidental.

(3) The third reason I put forward with some hesitation, as it consists largely of juggling with figures; nevertheless, in a subject such as this, where the true statistics are not available, nor ever will be, surely a little experimental arithmetic is legitimate.

In the 982 patients operated on during the 6 months under review, 79 were noted as having had a previous cataract extraction at Bamdah, and they had now returned for an operation on the other eye.

To get this return of 79, the average of the last 5 years, including 1924, was 1376 cataract extractions per annum; in that 79, there were 3 cases where the eye which had been operated on was now blind.

In the same 6 months under the same conditions, i.e. a ripe cataract in the unoperated eye, there were 68 patients with couched eyes; 24 of those patients were blind. It is argued by many that we see only the bad results of the coucher's art. Suppose, then that/

that in reality the couchers get as good figures as we do, then they must be doing nearly  $\frac{24}{3}$ , i.e. 8 times as many cataracts per annum as Bamdah. But Bamdah only does  $\frac{1}{3}$  rd. of the cataracts of the district under review, so we have  $1376 \times 8 \times 3$  as the number of eyes couched per annum; but, of course, if the Khayars are so good, the vast majority of their patients will repair to them again for the operation on the second eye, so that  $1376 \times 8 \times 3$  is only a fraction of the total done, a veritable reductio ad absurdum.

I think, then, that we may fairly conclude that the statistics, as given for couched eyes, do not err on the side of exaggerating the badness of their results, so that for the next part of this section, on couching, it will be held that the figures given in Class II represent reasonably fairly the couchers' results. Turning to another aspect of the same question which has arisen out of preceding figures, it seems to me to be rather an important matter as to just how many cataracts per annum the Khayars do in Bihar?

This again, I am afraid, consists in diving into the unknown, sometimes an interesting procedure but not always devoid of danger; as, however, it is an attempt to make the unknown less deserving of that name, I trust the shortcomings of its reasonings will not be too harshly dealt with.

The minimum figure, of course, which would serve as/



as an answer to the above question is 115,- which was the total number of couched eyes seen at Bamdah - multiplied by 3 + an indefinite number of dislocated cataractous lenses, some of which must have been done by the Khayar. Suppose we call this number 10, i.e half of the total of dislocated lenses diagnosed prior to operation; multiplying this also by 3, we arrive at 450\* per annum as the total, in itself a by no means despicable figure, but obviously much too small, as it is assuming that every couched eye sooner or later comes to hospital. The fallacies in such an assumption are as follows:-

(1) Many patients operated on die within a year or two of operation before.

(a) the couched eye goes wrong or

(b) the sight fails in the unoperated eye,

hence there is no necessity for coming to hospital to have an extraction done.

(2) Others are content to remain blind rather than undergo the ordeal of a visit to a European hospital.

(3) Still others repair to the coucher for the operation on the second eye, and only a fraction is seen by the European doctor; just/

\*  $115 \times 3 + 10 \times 3 = 375$ ; this is for the six months of the cold season, but in the full year Bamdah does from 1400 - 1500 cataract extractions, so that the total per annum is  $375 \times \frac{6}{5} = 450$ .

just what fraction of the whole, 450 is, presents a somewhat intriguing question.

The calculations made in the next few lines are at least an attempt to get some inkling as to what those figures may be. We find that the surrounding hospitals, doing say 3000 cataract extractions per annum, supply us with 17 patients having a ripe cataract in one eye, and a previous extraction done in one of those hospitals in the other, but the Vaidyans, doing x per annum, send us 68 in the same time, and under the same conditions; therefore we might conclude, at first, that they were doing  $3000 \times \frac{68}{17} = 12,000$  couchings per annum. This, of course, requires adjustment; the usual reason for a person coming for the operation on the second eye, after having had his first eye done elsewhere, either by a Khayar or a doctor, is dissatisfaction with the result obtained but the chances of dissatisfaction ensuing after a Khayar's operation are as 5 to 1 in favour of the Western doctor, calculating the Khayar's successes at 18%, and the Western doctors at 90%, judging by the same standard; therefore we divide the above figure by 5, getting 2400 as the number of cataracts done per annum by the Khayars.

It is obvious of course that 2400 is not an accurate figure; it is not even approximate; probably all we can say is that it is within 1000 of the correct total/

total one way or another. That the couchers' total lies within this margin of variation is, I think, a fairly reasonable supposition, bearing in mind once more that to see 450 couched eyes per annum necessitates a very much larger number of operations in the same time.

If this fact be admitted, the main point I wish to establish is gained, viz. that the Indian coucher does many more eyes than the majority of us give him credit for. The total number of cataracts done in the province of Bihar in the year 1924 was 4500; (Table V) if we grant that the couchers did 2,400, they did more than half; if 1400, almost one-third, and with the statistics of their results given on page 60, this means yearly a dreadful holocaust of eyes.

In conclusion then, we would just briefly emphasise once more (1) the exceedingly bad results obtained by couching as it is practised in India to-day and (2) the fact that it is so much more common than one is apt to think, gives it an economic significance of no small import.

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TABLE VIII.

Table of results given by various writers on  
couching:-

Himley:	96% successes. Power quotes B.M.J. October, 1901.
Graefe:	60% successes. Albertotti quotes I.M.G. 1904, p.371.
Haab:	40% failures. Operative Ophthalmology, p.174.
Maynard:	46% successes. I.M.G. 1905, May, p.193.
Drake-Brockman:	10% successes. I.M.G. 1910, June.
Holland:	95% failures. I.M.G. 1923, October, p.463.
Smith:	"All go bad". Couching for Cataract, p.22.
Elliot:	62% failures. Couching for Cataract, p.27.

Elliot's figures.

Total Number of couched eyes observed	=	780.
Successes	=	21.64%
Partial successes	=	16.69%
Failures	=	61.67%

Success=vision of one tenth and upwards.

P.S. = one tenth to ability to count fingers close  
to face.



APPEARANCE OF CATARACT.

It is a point of considerable academic interest at any rate, if not practical also, as to what factor causes the different cataracts to assume their various colours,<sup>1</sup> grey, white, blue, brown, and so on.

Does the colour reflect the condition of the cortex within, or is it more useful as an augury of the size of the nucleus, or is it merely the overlying capsule which gives to the lens its distinctive hue without any relationship to the underlying nucleus and cortex? These, and many more questions of a similar nature are bound to chase each other through the mental avenues and lanes of any cataract operator, who comes at all frequently up against them.

This question, if somewhat difficult in the West to resolve to one's satisfaction, is probably even harder in the East. Here, in Europe, it is calculated that over 90% of the cataracts are cortical, so that the nucleus, apart from the question of age for which allowances can be made, is more or less a constant; in India, where cataracts, starting in or near the nucleus, are probably the commoner of the two kinds, if we can call a gradual sclerosis and thickening of the nucleus a cataract; the solution is even a more difficult one as, although a cataract may be nuclear to/

<sup>1</sup> Elliot gives it as his opinion that the colouration of the lenses is due to a migration of pigment from the pigmentary parts of the retina and probably from other parts as well. 'Couching for Cataract'. R.H. Elliot p. 32.

to begin with and remain such, yet, from experience, one would say that a great many of those nuclear cataracts developed cortical lesions, so that, when seen in hospital, they are, so far as naked eye appearances go, to all intents and purposes cortical cataracts, and, only after operation, when we gaze upon a huge hard sclerosed brown nucleus with its thin outer rind of cataractous cortex, do we realise that we have been deceived once more.

Other things being equal, so far as the operation is concerned, it can hardly, I think, be gainsaid that the smaller the corneal incision the better. This holds true to a much greater extent also in India than at home. Here, ample and adequate nursing facilities are always present; there, the reverse is the case, so that a small quickly healed incision is even more important in that land than here.

With these objects in view, we tabulated fairly carefully, under the various headings explained below, the naked eye appearances of the cataract prior to operation to see if it were possible to establish any connection between the appearance before operation and the findings after, especially with regard to the nuclei and cortices of the lenses.

COLOUR./

COLOUR.

White to Blue:- These cataracts ranged from a colour almost pure white to others distinctly blue. The vast majority, however, were of varying degrees of whiteness, reminding one consistently of the adjective milky, when there has been added to the liquid of that name a full and plentiful supply of water.

Grey:- This class, if anything slightly greater in numbers than the preceding ranged from greys, which were perhaps nearer white, to those, which were more greenish than grey. The majority, however, were of the somewhat nondescript colour usually designated by the word grey.

Others:- These were almost entirely composed of browns and greens - a small class less than one-tenth of the total, and in the majority of cases, at least so far as the greens were concerned, probably not true cataracts at all, but lenses with very much sclerosed nuclei. Such then were the three classes into which we put our cataracts according to colour. Now and again the classifications overlapped, as classifications are apt to do, and, even with the best will in the world, it was hard at times to know whether to call a certain offending lens 'blue white' or grey; such cases, however, were not unduly frequent, and may be disregarded in a large series like the present.

MARKINGS:-

These have been tabulated as 'Striation', 'Mottling' and 'Clear', and, as such, are sufficiently self-explanatory to require little more to be said about them. Striations were of all types, broad, narrow, faint, distinct, and the same applies to the mottlings. They were written down according to their varying degrees, but, when it came to the final tabulation, it was deemed inadvisable to include all those sub-types, so the tabulation was done as explained above. Here, of course, there was also crossing and inter-lapping both between the striations and the mottlings, and the mottlings and the clear, but that was to be expected, seeing these are, in all probability the various stages which the average cataract will go through on its way to hyper-maturity - striation - mottling - clear - morgagnian.

Studying the results in Table IX, it will be noted that in classes I and II, the total number of abnormalities is 45 out of an aggregate of 1113, giving a percentage of 4.04, which is a fairly small fraction of the whole.

The next point which fixes our attention is the remarkable similarity of the figures for the 4 main divisions of these classes, where the percentages of abnormal cases ranged from 3 - 4. The remaining two classes/



classes had higher percentages of abnormals, 8.8 and 6.1 respectively, but, as the total number of cases included in those sections only comes to 189 in all, and since, in addition, the markings in one case were striated in type, and in the other mottled, it hardly seems justifiable to make any deductions dealing with them alone, beyond noting the fact of their difference, and keeping it in mind.

If now we rearrange our classification keeping the division according to colour the same, but recording the appearance as marked and unmarked (clear), then the figures come out as follows:-

#### CLASS I.

(White to Blue)

	<u>Total</u>	<u>Abnormalities</u>	<u>Percentage.</u>
Marked	226	12	5.3
Clear	306	12	4
	<u>5.32</u>	<u>24</u>	<u>4.5</u>

#### CLASS II.

(Grey)

	<u>Total.</u>	<u>Abnormalities.</u>	<u>Percentage.</u>
Marked	230	10	4.3
Clear	351	11	3.1
	<u>58.1</u>	<u>21</u>	<u>3.6%</u>

From the foregoing then, little can be inferred beyond the broad fact that Class II is slightly less liable to give difficulty in extraction than Class I, the figures being 3.6% and 4.5% respectively, and that the unmarked cataracts in each case come out easier than the marked. These differences, however, are too slight to be of any value in separating one class from another; in fact, rather than accentuate the difference, one is exceedingly surprised at the uniformity of the results obtained.

The figures for Class III need not be gone into at any length. In 92 cases, there were 10 difficult extractions, a percentage of nearly 11, which is very much higher than the corresponding figures in Class I and II, and it will be noted that here 6 out of those 10 occurred in clear green lenses, probably not cataracts at all in the true sense of the word, but rather sclerosed nuclei.

It is obvious that the information yielded by this frontal attack has been largely negative. We can, however, tackle the problem by another route, and see if anything comes of our new method of approach.

Difficulty in the birth of the lens may be due to one or all of 3 things, - excluding that which comes from the making of too small an incision.

- I. Capsule, tough, resistant, and bound down to cortex.
- II. Cortex, sticky.
- III. Nucleus, large.

If we can diagnose those before operation, the rest obviously is easy. A capsule, tough, and resistant, may usually be noted by the naked eye, as frequently it has calcareous deposits on it, and the cataract, oftener than not, is one of long standing, so that the question of differential diagnosis here need hardly worry us. A big nucleus alone may cause difficulty in extraction, but this is, I think, questionable, as nearly all difficult births with big nuclei have, in addition, solid and sticky cortices, and we only need to think of the average morgagnian cataract, where, within reason, and other circumstances being equal, the bigger the nucleus the better, to come to the conclusion that the crucial factor in the question of difficult birth is that of the type of cortex underlying the capsule. Bearing this fact in mind, it will be seen that, if we are to solve the problem, we must know

- (1) The various types of cortex to be met with,
- (2) The influence of those varying types on the difficulty or otherwise in the extraction of the lens.

The first of our requirements was met by grouping the cortices under five headings, viz:-

Fluid/

fluid	)	
semi-fluid	)	morgagnian.
semi-solid		
solid		
solid	+	

The second we will proceed to answer now as best we can.

Looking at the figures given for the different types of cortex, (Table XI) we find that the first three classes comprising 56.6% had 9 difficult births, while the remainder, 43.4% had 44 such cases, i.e. for every one case of difficult birth in the former class, we had 6 in the latter. This, in a way, is just what one would expect. The morgagnian and semi-morgagnian are hardly likely to give much difficulty from nucleus or cortex, although, occasionally, as in the two cases noted, a tough capsule, which refuses to split, makes the extraction difficult. This, however, can usually be seen with the naked eye. The semi-solids, i.e. those with no free fluid at all but with a cortex not unlike semolina yielded 7 cases. The remainder, the solid cortex patients, gave practically all the trouble, so the question now rises: "Is it possible to diagnose with the naked eye beforehand those cataracts with solid cortices?" We can, it is true, diagnose with a reasonable degree of certainty, /



certainly, a morgagnian or semi-morgagnian, but that, in the series under review, was only 25.8%,<sup>1</sup> leaving 74.2% distributed under the three headings, semi-solid, solid, and solid + . As it is the last 2 classes only which chiefly concern us at present, we will examine the findings of a representative 100 such cortices in a little more detail. (Table XII)

The figures in Table XII are at first somewhat bewildering and paradoxical, as we find that Class II (Grey) have 55% of this type of cortex compared with the 22% of Class I (white to blue) and yet, as we proved before, the former were rather better than the latter so far as figures for difficult extraction were concerned.

Inquiring into the matter a little further, we see that, with the exception of the striated and clear types of Class I (white to blue), the ratios for the cortices under discussion are very similar, the percentage figures obtained being approximately one-tenth of the whole in the remaining 4 sections, e.g./

1. Note the high percentage of hyper-mature cataracts. Maynard quotes 25.59% in a series of 1000 cataract extractions performed by him.  
'Manual of Ophthalmic Practise'. F.P. Maynard, p. 167.

e.g.:-

		<u>% age Solid and Solid + Cortices.</u>	<u>Total Number.</u>
<u>White to Blue.</u>	Mottling	9%	91.
<u>Grey.</u>	Striated	9%	98.
	Mottling	13%	132.
	Clear	33%	351.

In the two classes which are exceptions on the other hand, the corresponding figures are:-

		<u>% age Solid and Solid + Cortices.</u>	<u>Total Number.</u>
<u>White to Blue.</u>	Striated	2%	135.
	Clear	11%	306.

i.e. those two classes possess only some 70 lenses with solid and solid + cortices out of a total of 441 in these two classes, yet the same two classes give us 15 difficult births, which as we saw, are in 6 cases out of 7 due to solid and solid + cortices. The inference then is that the clear and striated cataracts of Class I (White to Blue) are on the whole less likely to give trouble in extraction than those of any of the other sections, because of the scarcity of solid and sticky cortices among them, but that, when those cortices do occur in those two classes, the likelihood of their giving trouble is much greater than in any of/

of the other sections, so that the obvious course open here, if further research were to be given to the subject, would be to concentrate on the striated and clear cataracts of Class I (White to Blue) and see if we could not diagnose beforehand those among their number which were possessed of the solid cortices. If this were possible, then in these two classes named, when we knew we were dealing with such cortices, a slightly larger incision could easily be made; in the other 4 classes, diagnosis of solid cortices beforehand would be of little value, seeing 55% of the cataracts possess such cortices.

Summing up then on this question as to how much one could tell by the naked eye before operation concerning the type of cortex present, we would say that:-

(1) In a very limited number of cases, the capsule helped, i.e. if there were calcareous deposits present, suspicions were raised as to the condition of cortex and nucleus beneath.

(2) 25% were morgagnian, and as such were in practically all instances clinically diagnosable by inspection.

(3) The striated and clear cataracts of Class I (White to Blue) have in nearly all instances a semi-solid or semi-fluid cortex which allows of easy extraction of the lens, but, in those few cases where the/

the cortex is solid or solid + , the chances of its causing difficult birth are much greater than elsewhere.

(4) Clinical observation showed that the more clear and translucent the appearance of a ripe cataract was, the easier was the extraction, and conversely, the duller it looked, and the more opaque it was, the more suspicious was the operator as to the type of cortex he would find.

It will be seen then that the results of these investigations from a practical standpoint were of little value; the finding indeed which was most useful to the writer was the simple one that the stickiness or otherwise of the cortex varied inversely as the translucency and sheen of the cataract. After all, there is so little difference in the healing power of an incision equal to one-third of the circumference and another two-fifths, that the failure of this line of investigation to yield any valuable results is not of great practical importance from the operative point of view. That the problem of appearance being sometimes deceptive is not an entirely new one may be judged from the following, written in the Middle Ages:-

After its perusal, one may feel that there is little more excuse for a 20th century exponent of the art of extraction who found that, all too frequently in the world of cataracts, 'things are not as they seem'.

"The matter of the cataract presents extraordinary wonders;/"



wonders; often one sees, that is to say, a strange cataract, appearing old and it appears also thick and solid, and thus one judges it is a favourable one for operation, but, if one touches it with the instrument, it often will not tolerate any drawing away, it will not be grasped, nor pushed, much less couched, and on the other hand it reascends upwards like cotton or like a feather in water. I have seen and operated on cataracts which were 20 or 30 years old, and which one would have thought the finest (for operation) but instead in the operation they have dispersed or melted away like butter in the eye. And this occurs generally with white milky cataracts, on the contrary, I have seen and operated on cataracts of only 6, 12 or 20-30 weeks; from their appearance one would have thought them not fit for operation, but they have proved very good, and the persons to have wonderfully good sight afterwards. But, for such it is necessary to exercise much discretion." <sup>1</sup>

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1. Benvenuto. Extract from Manuscripts of Naples and the Vatican.  
Indian Medical Gazette 1904. June. p. 368.

APPEARANCE OF CATARACT.

Bamdah Figures.

TABLE IX.

## I. WHITE-BLUE.

	Normal Extractions	Abnormals*	Total	Normal %age	Abnormal %age
Striat.	131	4	135	11.2%	3.0%
Mottl.	83	8	91	7.6%	8.8%
Clear	294	12	306	25.5%	3.9%
TOTAL	1508	24	532	44.3%	

## II. GREY.

Striat.	92	6	98	8.2%	6.1%
Mottl.	128	4	132	11.0%	3.1%
Clear	340	11	351	29.2%	3.1%
TOTAL	560	21	581	48.4%	

## III. OTHERS.

## BROWN.

## GREEN.

	Normal Extractions	Abnormal	Total	Normal	Abnormal	Total
Striat.	2	0	2	2	1	3
Mottl.	0	0	0	2	1	3
Clear	8	2	10	68	6	74
TOTAL	10	2	12	72	8	80
		+ 80 = 92 = 7.7%				

Aggregate = 1205

\* Abnormals were those cataracts where the birth of the lens was difficult.

APPEARANCE OF CATARACT.TABLE X.

## I. WHITE-BLUE.

	Total Extractions	Abnormals	%age Abnormals.
Marked	226	12	5.3%
Clear	306	12	4.0%
TOTAL	532	24	4.5%

## II. GREY.

Marked	230	10	4.3%
Clear	351	11	3.1%
TOTAL	581	21	3.6%

TABLE XI.

## CORTEX FIGURES.

Type of Cortex.	Number of Normal Extractions.	%age of Total.	Abnormals (D.B.)
Fluid	130	11.4	2
Semi Fluid	164	14.4	0
Semi Solid	351	30.8	7
Solid	341	29.9	34
Solid +	155	13.6	10
TOTAL	1141		53

APPEARANCE OF CATARACT.

Figures obtained in a representative (consecutive) hundred cases with the solid types of cortex.

TABLE XII.

## I. WHITE-BLUE.

	Solid Cortices in 100.	Solid Cortices in 532.	Total
Striat.	2	11	135
Mottl.	9	48	91
Clear	11	59	306
TOTAL	22	118	532

## II. GREY.

	Solid Cortices in 100.	Solid Cortices in 581.	Total
Striat.	9	52	98
Mottl.	13	75	132
Clear	33	191	351
TOTAL	55	318	581

## BROWN. III. OTHERS. GREEN.

	Solid Cortices in 100.	Solid Cortices in 100.
Striat.	1	2
Mottl.	0	2
Clear	4	14
TOTAL	5	18



T E N S I O N.

It had I think, better be confessed at once that the original idea of taking the tension in every eye in the series of cases was more to collect a set of interesting data, e.g. for a thesis, than to be of practical use to the operator. As to whether the former has been achieved or not will obviously be a matter of opinion; on the latter point, however, the author now personally has no doubt as to the value of the routine use of the tonometer in cataract extraction. This little instrument is a luxury which he would be very loath to be without; that, even on this subject however, opinion may differ, is obvious.

Smith<sup>1</sup> says, and we find very similar words in May and Worth<sup>2</sup> "The training of the finger tips in determining tension is equally important. They tell him much of what his eye can tell him as regards tension, and he obtains a more delicate estimate with them concerning tension than by any instrument, always presuming they are trained in the art." These are weighty words coming from a man with an experience of over 30,000 extractions to his credit.

Cruickshanks/

1. Treatment of Cataract. H. Smith. p.1.

2. Diseases of the Eye. May and Worth.

Cruickshanks<sup>1</sup> in an illuminating article on Choroidal Haemorrhage expresses his ideas as follows:-  
 "At best the fingers serve only as a rough guide, and in many instances give quite fallacious ideas as to tension ..... Cases received in the operating from the out-patient room without any note as to tension were found to give readings of from 50 mm.Hg. (MacLean Tonometer) ..... ; on the other hand, cases sent in with 'cave tension' were found normal."

It is rather hard to square those two statements; rather than attempt to do so, we will move on to somewhat safer ground, and give our first series of figures.

The tension was recorded by a Schiotz Tonometer in 1241 eyes. The figures under the heading 'tonometer reading', are the numbers registered on the scale of the instrument using the lightest weight, i.e. 5.5 gms; the mercury equivalent of the corresponding tonometer readings has been inserted, more for the sake of interest than anything else as I think it is generally admitted that these pressure readings are neither absolutely, nor compared with another instrument relatively correct, i.e. so far as the equivalent ~~is~~ concerned. The Maclean instrument probably gives the/

1. M.M. Cruickshank. "A note on the complication following 1322 consecutive cases of cataract extraction."

Indian Medical Gazette 1923, Oct. p. 461.

the truer reading, but, if necessary, the figures can be transcribed from one set of readings to the other without difficulty. Unless where otherwise explained, the numbers we shall use here in discussing the results will be the actual tonometer readings (Schiotz) with a 5.5 gms. weight.

The table explains itself; 5 is obviously the commonest scale reading, 4, 5, 6, and 7 among them, make up 81% of the total; the other numbers from 3 - 10 are also common.\* Dealing first with that part of the scale above 10, it is extremely interesting to note that, out of these 1241 cases, 3 had a tension of 11 and 2 of 12. There were no cases above 12. The sharp fall from 36 with 10 to 3 with 11 is also somewhat curious; that these cases are just as suitable for operation as the others is shown by the fact that in 3 out of the 4 patients so affected, the vision, when tested on the eighth day, was found to be good. These eyes, of course, were to all intents and purposes, apart from the tonometer readings, normal. It would be interesting to know just how low the reading could be in an otherwise normal eye, and yet give good results. There were, of course, many cataracts/

\* Tensions of from 3 - 6 may be considered normal. Any tension above 28 (Schiotz) or 45 (McLean) should be regarded as pathological; and a tension above 25 (Schiotz) or 42 (McLean) as suspicious. Tensions below 13 (Schiotz) or 20 (McLean) are subnormal.

cataracts with readings below this, but they were refused operation, not because of the lowness of the reading, but because the eye was obviously, if it were not already blind, quite unfit for extraction of the cataract. All normal looking eyes, no matter how low their tension with the tonometer, were operated on, and we see how few such eyes there were.

We now come to what is, I think, the most interesting part of this subsection, viz., those eyes with a tension below 3. In the table, those are returned as 2; for the present, let us disregard this return, and look at the question of increased tension in cataractous eyes as it affected us at Bamdah.

Cataractous eyes, with increased tension, may, like many other things, be set out under 3 different headings:-

1. Increased Tension, obvious with fingers.
2. Increased Tension, doubtful with fingers.
3. Increased Tension with Tonometer only, previously diagnosed as normal with fingers.

Classes 1 and 2 need little explanation; all degrees were represented from the white calcified lime-like cataract, with large immobile lens, eye stone-hard to touch, ring of red round cornea, no perception of light, and degenerate iris, to that in which the cornea was just becoming steamy, the anterior chamber not as deep as before, and the pupil was enlarging with/



with reaction to light sluggish, merging imperceptibly into class 2, where one suspected increased tension, and the physical signs pointed that way, yet, with a tonometer, it seemed sufficient to put a question mark, and leave the decision till afterwards. Class 3 were those passed in the dispensary as normal, and turned down by the tonometer on the operation table.

The numbers of the various classes were as follows:-

Class 1.	-	23	)	
Class 2.	-	8	)	50.
Class 3.	-	19	)	

The numbers for Class 1 are only approximate as they were jotted down from memory, sometimes from day to day, sometimes from week to week as they came along. I think, however, they are sufficiently accurate to merit their receiving as full consideration as the others. The remaining figures, like all the rest in this series, unless otherwise noted, were recorded on the special printed case sheets. In connection with class 2, 8 may seem and is a small number, but it has to be borne in mind that we are only dealing with doubtfuls unoperated on; there were 8 such, but there were probably more than 8 marked ? in the dispensary which the tonometer classed as normal, and were accordingly operated on. These numbers unfortunately have not been kept. This fact has to be borne in mind when/

when dealing with the figures in class 2, for if the tonometer had not been in use, those eyes would all have had an iridectomy done instead of a cataract extraction.

The numbers for class 3, viz. 21, were made up as follows:-

<u>Tension.</u>	<u>No.</u>	
1 -	4 )	
1	4 )	
$1\frac{1}{2}$	1 )	21.
2	6 )	
$2\frac{1}{2}$	6 )	

These all\* had an iridectomy done, and were told to return for the extraction when it suited them, any time after three months.

Before drawing any inferences as to the value or otherwise of routine tonometer readings, it is obvious that the figures for choroidal haemorrhage must be submitted. In this respect, I propose to quote a case where it occurred.

Bhupal Lal, No. 322, Age 60, Oilman by caste, cataract extracted from right eye 1 year ago at Bamdah, left eye tension 5, ripe cataract. Operated on/

\* All is hardly the correct work to use here, as two of the six which had a tension of  $2\frac{1}{2}$  were operated on as seen in table XIII.

on by the Smith method on Jan. 10th, 1925; there was a fair amount of vitreous lost at the time of the operation. Pain was experienced in eye on the 12th after sneezing; he came to me on the 13th, and, on opening the bandage, a gaping wound was found with an indistinguishable mass of vitreous and iris protruding. There was no bleeding although some blood was present on the bandage; although the prolapse was snipped off, it was found impossible to get the lips of the wound together. The eye became totally blind.

This gives us one haemorrhage in 1250 cases. The proportion of haemorrhages at Bamdah for the last five years, with a very experienced operator in charge was .41%, made up as follows:-

1920	-	1107	-	4
1921	-	1440	-	5
1922	-	1388	-	7
1923	-	1426	-	6
1924-5 (6 months)	-	1250	-	<u>1</u>
				<u>23</u>

Writing on the same subject, Newman<sup>1</sup> says:

"If it were possible to reject all cases of cataract with increased tension as unsuitable for operation, statistical/

1. Irrigation in Cataract Extraction. E.A.R. Newman,  
p. 93.

statistical results would be much improved; such a course is on the face of it impracticable, and would in effect condemn many patients to permanent blindness."

In 1250 eyes, the tonometer turned down 21; as an offset to this are the eyes it permitted to be done where commencing increased intra-ocular tension was diagnosed by appearance and - effect of suggestion, which fingers can never quite get over no matter how much they are trained - by the touch. Unfortunately, I have not kept the figures of such, and, anyway, those numbers would obviously vary with experience and temperament; shall we say 9, leaving the adverse balance against the tonometer as 12. Choroidal haemorrhage was 1 instead of the previous annual average of 5, i.e. four eyes were probably saved for a later operation, leaving a balance of 9 against the tonometer, but looking at the figures in table XIII it is, I think, obvious that our arbitrary figure of 3, as the highest tension permissible for safe operating, is perhaps a little on the low side, and that  $2\frac{1}{2}$  and even 2 might be quite safe. If we allow tensions of 2 to be operated on, then 12 more cases would be added to our list, i.e. a gain of 4 for the tonometer. If we fix the limit at  $2\frac{1}{2}$ , the addition is 6 cases instead of 12, a decrease in the number of cases operated on by 2. At the worst, then, by the routine use of the tonometer, /



tonometer, 8 cases less than might have been were operated upon; at the best, 4 more cases than were done might have been submitted to operation with safety. As an offset to the first statement, we must remember that one eye destroyed by haemorrhage probably does more harm to the reputation of a hospital than the good which accrues to it by many successful extractions, so that, taken all round, even if we decide that, so far as actual figures go, several cases are unoperated on each year which might be done, the arguments in favour of the tonometer are very strong indeed.

Before giving the usual summing up of our opinion on the use of the tonometer, we would like here to insert the result arrived at by Cruickshanks<sup>1</sup> after a somewhat extensive use of the same instrument.

"Were one asked to specify the most important lesson which the work at Shikarpur this year has taught, one would have little hesitation in saying that it was the necessity for the routine use of the tonometer in estimating intraocular tension in cases of cataract."

#### CONCLUSION.

(1) The tonometer, under Indian conditions of operating, is a necessity rather than a luxury.

(2)/

1. M.M. Cruickshanks. 'Choroidal Haemorrhage following cataract extraction'.

Indian Medical Gazette. May 1925. p. 213.

(2) Extractions may safely be performed up to 3 or perhaps 2. (Schiotz actual reading with 5.5 gm wt.)

(3) The routine use of the tonometer (a) increases the number of eyes operated on rather than decreases it, (b) lessens incidence of choroidal haemorrhage, (c) lessens vitreous escape.

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TABLE XIII.

## TENSION.

Bamdah Figures.

Tonometer Reading. (Schiotz).	Hg. Equivalent.	No. of Patients.
2.5	27mm.	2
3	25N	64
4	21	148
5	19	408
6	15	233
7	13.5	219
8	11.5	84
9	10	40
10	8.5	36
11	7.5	3
12	6	2

1241

A N A E S T H E T I C S.

A question of some moment to cataract operators is what anaesthetic has to be used. The majority, I think, use cocain, and Bamdah was no exception to the rule, although, incidentally, the cocain was given in powder form and not in solution. Butyn,<sup>A</sup> however, was being highly praised in many quarters, so it was decided to institute a comparison between Cocain and Butyn. This was first done in the months from October - December 1924.

In January 1925, it was decided to open the list to a mixture of potassium sulphate and cocain,<sup>B</sup> and later on, in March, Psicaine<sup>C</sup> was included. We propose giving here a general account of the results of the tests of those four anaesthetics in the months from January 8th - April 6th. In that time, 639 cataract patients provided the data.

For several reasons, I think the figures about to be given may be taken as perhaps more than usually accurate where such variable factors as human beings are concerned.

1. The operator remained a constant throughout, - to borrow mathematical terminology.
2. Operations were performed daily, the numbers ranging from 20 - 30 daily at the height of the busy/



busy season to 1 - 2 per diem in April, when numbers were rapidly falling off. Such figures made extraction a second habit, so that variations in the operator's skill - or lack of it - were small; this is an important factor in dealing with statistics into which the personal equation enters.

3. Considerable experience in registering the type of patient had been achieved in the preceding 13 months. This made the defects of the scheme fewer than they otherwise would have been.

In addition to comparing the anaesthetic powers of the various drugs mentioned, we were also anxious to get some definite information on the following points as text-books and the usual sources of information appeared to differ here, even more than usual.

1. Are men or women the better patients?
2. Do Mohammedans make better patients than Hindus or vice versa?
3. Is there any appreciable difference among the various castes as subjects for operation?

The full scheme devised for indicating the various types of patient was as follows:-

1. Perfect.
2. (a) Pressing unduly on insertion of speculum.  
(b) Undue movement at time of taking tension.  
(c) Snatching away of eye when gripped by forceps.  
(d) Some pressing during corneal incision.  
(e)/

- (e) Wincing at cutting of iris.
  - (e -) Perceptible flutter of eyelids at cutting of iris.
  - (f) Bad behaviour during expression of lens.
3. (a) 2 d intensified.
  - (b) 2 e intensified.
  - (c) 2 f intensified.
  4. (a) Outrageous 3 a.
  - (b) Outrageous 3 b.
  - (c) Outrageous 3 c.

This scheme may appear somewhat cumbrous; in use it was very simple as each of the six steps of the operation merely had one of the letters of the alphabet attached to it, and any departure from the orthodox was at once noted down as above; e.g. if, during the corneal incision, the patient was somewhat inclined to press his eyelids together, he was written down in the appropriate space as 2 d; if, however, his behaviour during this part of the operation was really bad, he was labelled 3a and so on.

Practically, 2 a. b. c., may be neglected; the only reason for including them was because it was felt that if 2 were to be written, then, the operator might as well know at what step in the operation the patient's behaviour had been '2' instead of '1'.

The supreme test of the value of an anaesthetic is, I think, the behaviour during iridectomy, accordingly,/

accordingly, we have grouped together the number of 2 e, 2 e-, and 3 b obtained for each drug, and treated them as one class.

Another useful, although not quite so reliable, indication is the percentage of 'perfect', (class 1,) patients obtained per anaesthetic; this is not so reliable as the other series of figures inasmuch as a stoical individual with a moderate anaesthetic might be classed as appropriately under '1' as a more nervous patient with a better anaesthetic. It is obvious that this does not apply to the movement at iridectomy figures to anything like the same extent as, no matter how stoical an individual may be, he would, I should think, find it hard not to betray, at least by a slight wince or flutter of the eyelids, that some pain was being caused at the iridectomy if this were the case. Just because of this, 2 e, 2 e-, and 3 b were all given similar values in totalling the results because it was felt that the different degrees of behaviour at the cutting of the iris were due not so much to the difference in the anaesthetic as to the varying temperaments of those operated upon.

With regard to the actual method of producing the anaesthesia, the usual plan of instilling a solution into the eye at regular intervals was adopted. The first instillation was given in the ante room to the theatre immediately after the patient had his eye douched/

douched by the somewhat vigorous Herbert-Bamber\* method; the next two or three drops were received when the patient was put on to one of the two operating tables, and the third series he received just prior to the operation itself; occasionally, but not usually, a fourth set of drops was given.

Dealing with the results themselves, it was felt that, in order to get an absolutely uniform method of counting, it would be best to take the months from January 8th - April 6th as, before that period, there were one or two slight alterations in the scheme which prevent the whole period of 6 months from being considered. The number of cases dealt with was as follows:-

<u>Anaesthetic used. **</u>	<u>Strength.</u>	<u>Number of Cases.</u>
C	5%	163
B	2%	203
P	Cocain 3%. Pot. Sulph 2%	165
S	3%	<u>108</u>
Total		639

\*  $1\frac{1}{2}$  - 2 minutes douching of the everted eyelids with a stream of 1-4000 perchloride of mercury from a height of 18 inches.

\*\* C = Cocaine  
 B = Butyn  
 P = { Potassium Sulphate  
       { Cocain  
 S = Psicaine.



Dealing with the figures for the patients who moved at iridectomy, i.e. Class 2 e etc., we find that there were

#### CLASS 2 PATIENTS.

3.	65	such	out	of	163	C	patients	=	39.88%
2.	64	"	"	"	203	B	patients	=	31.53%
1.	40	"	"	"	165	P	patients	=	24.24%
4.	47	"	"	"	108	S	patients	=	43.53%

CLASS I PATIENTS      Total 639.

#### CLASS 1 PATIENTS.

Coming now to the patients who acted as if an operation for cataract extraction were an everyday occurrence in their lives (Class 1) there were

3.	79	such	out	of	163	C	patients	=	48.47%
2.	108	"	"	"	203	B	patients	=	53.20%
1.	94	"	"	"	165	P	patients	=	56.96%
4.	50	"	"	"	<u>108</u>	S	patients	=	46.29%
					Total		639		

From these experiments, one would conclude that the mixture of potassium sulphate and cocain is the best of the 4 drugs used as a local anaesthetic for the eye, then comes butyn, then cocain, and last of all psicaine.

The difference between cocaine and butyn is considerable, so also is the difference between mixture  
P/

P and butyn, but the difference between cocaine and the aforesaid mixture is marked, especially when we consider that the same powdered cocaine was used in both cases; in the mixture, a 3% solution was used, in the other a 5% solution, i.e. a weaker solution of cocaine, by the addition of potassium sulphate, has been given a stronger anaesthetising power than another solution where nearly double the strength of cocaine alone was used. It is obvious then that the potassium sulphate has a distinctly fortifying effect on the anaesthetic power of cocaine. The mixture, of course, is also cheaper than cocaine, so that it appears to score in every way.

With regard to butyn and cocaine, the difference is obviously in favour of the former, but not markedly so. When we remember also that the cocaine had been in stock for a period probably exceeding two years, and that the butyn was fresh from the importers, it has to be admitted that the discrepancy would probably be decreased still further if both were fresh. In addition, butyn is 7 times as expensive as cocaine, and this is always another point in favour of the latter drug.

Psicaine was markedly inferior to all three, and more expensive than cocaine, so need not be considered further.

Having finished the first part of this section which/

which dealt with anaesthetics themselves, we now come to discuss the reaction of the various types of patients to those anaesthetics.

The first point we wish to consider is the question as to whether men or women make the better patients, from the cataract operator's point of view.

Opinions on this subject are somewhat divided - a state of affairs by no means unusual when dealing with the subject of cataract and its allied conditions - Holland and Cruickshanks<sup>D</sup> both agreeing that women are better than men, while Maynard and the Census of India Report<sup>E</sup> think the reverse.

There was no great difficulty, so far as we were concerned, in arriving at a conclusion on this point, as it simply meant tabulating the figures we have just been considering, this time for 'sex' instead of 'anaesthetics', and the result was obtained. The figures used for this purpose were those for class 3 and over, i.e. only badly behaved or outrageous patients were considered here, although the result arrived at was checked by finding the number of perfect patients, (Class 1) in each sex.

In the table we have given the number in Class 3 per anaesthetic with the sex percentage.

## CLASS 3 PATIENTS.

<u>Anaesthetic used.</u>	<u>Male</u>	<u>Female.</u>
C	7%	6.35%
B	8.59%	8%
P	9.8%	6.35%
S	10.14%	2.56%

In all the sections of these classes, we note that the men distinctly outnumber the women. The percentage of bad behaviour then among men is considerably higher than among women. When we come to analyse the figures for class 1 we find that the results here also show the women to be the better as they have a higher percentage of 'perfect' patients than the men, with the exception of the butyn results where the numbers are for once in favour of the male sex. The aggregate superiority, however, in Class 1, of the women over the men is 56.66% as compared with 48.77%.

Our conclusion then from those figures is that there are fewer bad and more good patients among women than among men, i.e. women make better patients than men.

Our next inquiry in this series was to find out how Hindus and Mohammedans compared as patients.<sup>F</sup>

Holland,<sup>D</sup> writing along somewhat similar lines, does not/



not go into the question of caste but merely says he has found the country labourer and field worker the ideal patient on whom to perform cataract operations. This helps us little, as both Mohammedans and Hindus are found in large numbers among these sections of the community. In fact, when we remember that 90% of the inhabitants of India might be put down as country labourers and field workers, we see just of how little use this opinion is to us. Dyer, writing in 1896, found Mohammedans to make much worse patients than their Hindu neighbours. This is rather the reverse of what one would expect when we remember the fatalistic attitude with which all believers in Allah accept their destiny. If we come down, however, to the realm of hard fact as apart from conjecture, we will see how the figures for these two great sections of the Indian community compare, so far as Bamdah was concerned.

Dealing first with the 'perfect' patients (class 1) we find that among the Hindus, there were 289 such out of a total of 557, i.e. 51.71%, whereas, out of a total of 82 Mohammedans, there were 42 such patients, i.e. 51.22%.

When we analyse the results for the patients who behaved badly (classes 3 and 4), we find that the 557 Hindus had 50 of this type among their number, while the 82 Mohammedans produced only 2, giving percentages of/

of 8.98 and 2.44 respectively.

The class 1 figures are practically identical for both Hindus and Mohammedans; the class 3 results show the percentage of badly behaved patients among the Hindus to be between 3 and 4 times as high as among the Mohammedans. The conclusion therefore is that Mohammedans make better patients than the Hindus.

Our third and last analysis in this section consisted in comparing the various Hindu castes with a view to finding if the different modes of life and the varying social conditions had any effect on the types of patient met with from the operator's point of view. For this purpose, rather than deal with the individual castes it was thought better to divide the Hindu community into three great sections, High, Trading and Low. The high and the low, in the vast majority of cases are agriculturists, but there is a world of difference between the comparatively easy life of the Brahman landowner and that of the low caste serf on his estate. The trading section of the community one would expect to be mentally quicker than their agricultural brethren, and, as a result of this and also from the fact that they were town rather than country dwellers, it was, I think, a legitimate conclusion to make that they would be worse patients than their rural dwelling brethren. Holland's finding, quoted in the previous section, that the farm labourer makes the/

the best patient, seems to bear out this assumption. Whether this theory can be proved definitely one way or another, it is now our purpose to discover.

CLASS 1 PATIENTS.

<u>High castes:-</u>	101	out	of	a	total	of	200	=	50.50%
<u>Trading castes:-</u>	15	"	"	"	"	"	37	=	40.54%
<u>Low castes:-</u>	175	"	"	"	"	"	320	=	54.06%

CLASSES 3 and 4 PATIENTS.

<u>High castes:-</u>	17	out	of	a	total	of	200	=	8.50%
<u>Trading castes:-</u>	3	"	"	"	"	"	37	=	8.11%
<u>Low castes:-</u>	30	"	"	"	"	"	320	=	9.38%

An analysis of these figures at first seems to lead us to no very conclusive result. The highest percentage of excellent patients is found among the low caste patients, which, so far, bears out Holland's contention; unfortunately, however, the highest percentage of bad patients is also to be found in this class, findings which taken together, do not appear to lead us far. The trading castes had the lowest percentage of Class 1 patients, but they had also the lowest percentage of classes 3 and 4, just the reverse of the result for the low castes. The high castes, in both cases, occupied a position midway between the low and the trading castes.

Examining/

Examining these results in more detail, especially with regard to the findings for both low and trading castes, we find that the figures in classes 3 and 4 are of such similarity as to permit of their being disregarded, the greatest difference, that between the trading and low castes, being 1.27%. In class 1, on the other hand, the difference between the same classes is 13.52%, a by no means inappreciable figure, which seems to prove fairly conclusively that so far as the low and trading castes are concerned, the former are the better subjects for operation.

Comparing the high and the low castes, I think the only conclusion we can fairly draw here is that, as subjects for operation, there is little to pick and choose between them. If there is any difference at all, it is in favour of the low castes. We would say then that as subjects for the operation of cataract extraction, the low castes are the best, closely followed by the high castes. Separated from these two by a considerable distance come the trading castes.

#### CONCLUSIONS:-

- (1) Out of the four anaesthetics used, the mixture of Potassium Sulphate and Cocaine was the best.
- (2) Women make better patients than men.
- (3)/



- (3) Mohammedans are better patients than Hindus.
  - (4) The Trading Castes make worse patients than the Agricultural Castes. There is very little difference between Low and High Caste Hindus as subjects for operation.
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C O N C L U S I O N .

Having reached the last milestone in a journey which if it has had its ups and downs as all journeys must, has been one of undisguised pleasure practically all the way, we would fain survey our handiwork for a second ere the curtain falls on its last chapter.

One of the many impressions which is perhaps common to all those who would essay to write a thesis is that this effort into which he has put so much time and attention, somehow seems to lack a central idea, and following on this, comes the thought that several if not all of the subjects have been dealt with very superficially. To these and many more less complimentary emotions we would plead guilty.

Yet the answer to those denizens of Doubting Castle is fairly obvious. An alternative heading for the thesis might have been "An analysis of 982 cataract case sheets". The central idea in such an undertaking is the analysis itself and the individual results achieved thereby. We were, I think, more than usually fortunate in that our analysis yielded us not only individual results, but in the shape of the conclusion given here, a deduction of no small value.

To the charge that we have dealt with the various sections in a somewhat superficial manner, we, while/



while agreeing, would enquire if it were possible to do aught else with the material we had to review.

The macroscopic appearance of a tissue is always necessary before we can have the microscopic finding, and it was the macroscopic view of the cataract question in one of India's provinces we were trying to give.

With this explanation, we will proceed to the deductions derived from the findings in the various sections.

Each of the parts of this thesis, though separate and distinct in itself, also goes to form a whole. In the formation of this whole, there are one or two sections which stand out more clearly than the others; we refer especially to the pages on 'etiology' and 'couching', for it is from them we wish to draw the conclusions which form one of the uniting threads of the preceding pages.

It will be remembered we gave the total number of cataracts extracted annually in Bihar as somewhere around 4,500 - Bamdah 1400, the other hospitals 3100 - an arresting total, and one being increased annually, but still capable of much improvement.

4,500 then is the number operated on each year; what is the number not done? This question, like many another asked in those pages, is impossible of solution, but/

but also like many another problem raised here, we feel that a partial solution is better than none, and perhaps will have sufficient in it of surprise to stimulate further interest and research in the matter.

Under etiology, it will be recalled, we estimated that if cataract occurred among the six million Semi-Hinduised aborigines and cowherds in the same proportions as among the other castes, then over 2000 cataract extractions which should have been done every year, remained undone.

The women we estimated as compared with the men had 900 cataracts not done which ought to have been operated on.

The Couchers were calculated to do 1400 - 2400 cases per annum, and here I think we may well take the latter figure considering the ultra conservative estimate we have made in the two preceding cases.

Our total then of cataract cases not done - or worse - comes to 5300 per annum as compared with the 4,500 done, i.e. the Province of Bihar has a cataract bill, potential and real, of at least 9800 yearly; in all probability the real figures are two or more times this amount, but for our purpose the figure given will suffice without further correction.

The facilities for the treatment of all those patients/

patients seem excellent on paper. Hospitals there are in comparative abundance, - government, mission, railway, etc., but when we come to look at them in more detail we find that practically without exception they are general in nature; in fact in the whole of this vast province of over 20,000,000 souls there is not a single hospital devoted exclusively to eye patients and yet surely nowhere else could we find so much justification for the establishment of special ophthalmic institutions.

If then we are dissatisfied with the existing régime, our dissatisfaction if it is to be of any use at all, must spur us on to a little constructive effort, that being so what type of hospital are we going to build to answer India's needs in matters ophthalmic.

The general hospital is, I think, out of the question, the need for these is probably as great as for eye hospitals, but with such abundant material to hand, combining the two seems a great waste of men, money and - most important of all - efficiency.

The next alternative, an eye hospital, run, as far as possible, on altogether Western lines might be ideal, but its cost would be prohibitive, more especially as in all probability several such institutions would be needed to satisfy the requirements of an area so extensive as that with which we are dealing.

We/

We arrive then, by a process of exclusion at a hospital modelled on the lines of that at Bamdah, where we find, not so much a hospital as a caravanserai, a place where the blind of all castes foregather for treatment, where we would have central modern operating theatres with their attendant ante-rooms, surrounded by long blocks of single roomed apartments, to each of which a patient and his friends would be allocated, the friends to do the cooking, the surgeon the treating - and within reason, I think, it will be agreed that the less a cataract is treated after operation the better - and the patient the waiting in hope. In addition there would be several general wards for those who required less immobilisation than cataract patients after operation.

Such a type of hospital is of course somewhat obnoxious to the perhaps over-civilized taste of the average European surgeon, but we have to remember that India is not Europe, that if our first principles are correct then the application of those principles must surely change in the changing countries; that it matters little whether the hospital or the patient provide the bed clothes, so long as the patient is content to remain in bed when he is told - and here we have to bear it in mind that practically all Indians when travelling carry their bedding with them, since hotels as we know them here, are very few and far between, /



between, so that to bury an eye patient between snow white sheets is a kindness which he neither understands nor appreciates, and it can hardly be said to be necessary.

The thought which at once assails us is that sepsis under the conditions above outlined would be rampant; the strange thing is that it is not; in the last 500 cases operated on at Bamdah during the cold season there were only 2 cases of suppuration; the bugbear of the operator was not sepsis but prolapse of iris which was very frequent, being about 15%; that this however is not an inherent defect of the system is proved by the figures from Shikarpur<sup>\*</sup> where doing some 1300 extractions per annum, they have a prolapse rate averaging 3%, yet the hospital régime at the hospital there is very similar to that in operation at Bamdah.

So much then for the defects, possible and real, of the system; what are its advantages?

Firstly, and pre-eminently, it is cheap; this is essential for success in a land where 8d a day is deemed a good wage for a labourer.

Secondly, it suits the patients, since coming to hospital does not mean separation from their family; it also prevents them being filched of their money by unscrupulous attendants and compounders, who are all too frequent in a land where bribery is rife, and/

\* Personal Communication.

and where the traditions of both doctors and nurses are hardly on the same level as in our own country.

Thirdly, this type of hospital closely resembles the ancient Hindu houses of healing, and therefore at a time like the present, is of value in that it excites no racial prejudice against it.

Fourthly, it is extremely popular. This is obviously a fact of considerable importance as no matter how good a hospital may be, if it does not meet the public favour then the good it does is a mere shadow of what it otherwise would do; this is especially applicable to India with its prejudices against all things Western. As proving the popularity of this type of hospital, we have only to look at the numbers of operations performed in the few which are in existence, to realise this.

Shikarpur does some 1300 extractions in about 7 weeks, in the cold season.

Bamdah does 1400 per annum as compared with 97 for the 6 government hospitals and dispensaries of Monghyr in the same time.

Hazaribagh, a neighbouring district, contains 2 mission hospitals run on similar lines to Bamdah; they between them do some 400 extractions per annum as compared with 22 for the government hospitals and dispensaries of the province.

The/

The 195 extractions per annum of the Santal Parganas are made up as follows:-

Government institutions . . .	79
Benagaria (a mission hospital run on similar lines to Bamdah) . . .	116

These differences between the figures for the government and the mission hospitals are rather striking; the government hospitals have the advantage in many ways, in numbers, in resources of men and money, yet they obviously are not reaching the people as they might; we have outlined some of the reasons why; another is that the biggest and finest government hospitals are built in large towns, whereas 90% of India's inhabitants are country born and bred, and as the statistics given under etiology prove, less than one-sixth of the inhabitants of the villages ever visit their principal towns. In Europe we rightly build our best hospitals in our biggest towns, in India on the other hand if we would get patients we ought to build our hospitals in the country, preferably in a small country town.

Enough has been said in those few preceding pages to give a somewhat sketchy idea as to what we think would constitute an ideal eye hospital from the Indian point of view.

We do not propose to give a more detailed account, - for the present at any rate - as such a procedure would/

would not be in keeping with the general tenor of this thesis, which has all along been to take a broad rather than a deep view of the problems with which the cataract operator in India has to grapple daily.

One word more, however, we would say on this subject and that is in connection with the problem of how best to popularise such hospitals once they were built. The best solution here, we feel, would be travelling dispensaries in charge of experienced sub-assistant surgeons. Their duties would be (1) To treat minor eye diseases, conjunctivitis, trachoma, corneal ulcers, etc.

(2) To give 'refresher' courses to the village head man, school teacher, etc. in the a. b. c. of the treatment of the commoner ailments of the eye.

(3) To diagnose cataracts, glaucomas, etc., and send them to hospital for operation. In addition, to supply all the patients whom he sent to hospital with a free railway pass from the nearest station to the hospital; a somewhat necessary piece of practical philanthropy if we would do the maximum amount of good in a land where poverty holds such sway.

Such then are a few of the lessons learned from our analysis; if the reader has derived as much pleasure from the perusal of these observations as we have in compiling them; the writer of this thesis will be more than satisfied.